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OF THE

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53D CONGRESS, 3d Session. } HOUSE OF REPRESENTATIVES. { Ex. Doc. 1, Part 3.

REPORT

OF THE

SECRETARY OF THE NAVY;

BEING PART OF

THE MESSAGE AND DOCUMENTS

COMMUNICATED TO THE

TWO HOUSES OF CONGRESS

AT THE

BEGINNING OF THE THIRD SESSION OF THE FIFTY-THIRD CONGRESS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1894.

REPORT

OF

THE SECRETARY OF THE NAVY.

NAVY DEPARTMENT,
Washington, November 17, 1894.

THE PRESIDENT:

The following new vessels have been completed and tried since the date of my last report:

Name.	Date of trial.	Trial speed in knots per hour.
		Knots.
Marblehead	Dec. 7, 1893	18.44
Columbia	Nov. 18, 1893	22.80
Olympia	Dec. 15, 1893	21.69
Montgomery	Jan. 19, 1894	19.056
Minneapolis	July 14, 1894	23.076

The *Indiana*, *Texas*, and *Oregon* have had unofficial preliminary trials under the direction of the contractors, and the *Maine* had her official machinery trial on October 17, 1894, her engines developing an indicated horse power of 9,224.3 for four hours, and showing an average speed of 17.45 knots.

The last naval appropriation act contained a provision authorizing the construction of three additional torpedo boats. The Department has carefully considered questions relating to the development of this type of vessel, both at home and abroad, and has finally decided upon the construction of torpedo boats of the general type of the *Ericsson*, with a slightly greater displacement, and to attain an average speed of not less than 24.5 knots on the acceptance trial. Advertisements for proposals will soon be issued, and the Department hopes to award the contract for their construction within a few months. There has been some delay in asking proposals for these boats, arising out of the failure of the contractors to have the *Ericsson* ready for trial. It was desirable to know before letting out the new contracts, as nearly as possible, what the *Ericsson* could do. Experience has shown the Depart-

ment the great importance of thoroughly preparing plans before beginning the construction of a vessel. The frequent changes that have been found necessary during the building of some of our ships have been annoying and expensive. The Department is making every possible effort to obviate, as far as may be, such necessities in the future.

No speed premiums will be provided for in the contracts for the building of these vessels. In the contracts for the construction of gunboats Nos. 7, 8, and 9 small premiums and penalties were provided for. This system undoubtedly had its advantages when adopted, but reflection has convinced the Department that the time has come when, with the experience that has been gained, it may with profit be abandoned.

In this connection, I would call your attention to the fact that the construction of torpedo boats is still actively carried on abroad, as is evidenced by the following table:

Torpedo boats.

Nation.	Number on hand.	Number authorized and building.	Remarks.
Argentina	22	.....	
Austria	64	.....	
Brazil	22	.....	
Chile	22	Some.	Number not known.
China	32	.....	
Denmark	29	.....	
England	175	64	
France	214	41	Also 3 submarine and 1 building.
Germany	127	.....	8 built last year; none in this year's budget.
Greece	51	.....	
Holland	39	3	
Italy	177	10	Also 1 sub-marine and 1 building.
Japan	26	23	
Russia	163	14	
Spain	24	24	
Sweden and Norway	53	.....	Sweden, 42; Norway, 11.
Turkey	53	3	
Total	1,283	182	

It will be noted that 17 countries are here enumerated, and that the smallest number of torpedo boats possessed by any of them is 22, while the United States, with more seacoast and more ports than any one of these nations, has of this class of naval vessels, now everywhere recognized as indispensable, only 6, and in this number are included the 3 now about to be built.

VESSELS IN COURSE OF CONSTRUCTION.

A reference to the report of the chief constructor will show that work on new vessels now in course of construction has advanced quite satisfactorily during the past year.

Progress in the construction of our armored vessels was for many years delayed by reason of the unexpected difficulties encountered by contractors in the manufacture of armor. As was anticipated, however, in my last annual report, armor is now being delivered at such a rate as to justify the expectation that both the companies now under contract with the Government will complete their deliveries during the coming spring. The statements made hereafter as to the periods at which vessels are expected to be completed are therefore advanced with full assurance that they are reasonably accurate.

Work on the first-class battle ship *Iowa* is progressing as rapidly as the requirements of good workmanship will permit, and it is expected that the vessel will be completed during the latter part of 1896.

The first-class battle ships *Indiana*, *Massachusetts*, and *Oregon* are well advanced toward completion, and will be in condition for acceptance by the Government within the coming year.

The second-class battle ship *Maine* will be ready for commissioning before the end of this fiscal year. She is being built at the New York navy yard, and her recent machinery trial at sea indicates that she is to be a gratifying success.

The second-class battle ship *Texas* is practically ready for her machinery trial, and should be completed and ready for commissioning a few months later.

Work on the armored cruiser *Brooklyn* is progressing favorably, and it is expected that this vessel will be completed during the early months of 1896.

Rapid progress is being made on the double-turreted monitors *Puritan* and *Monadnock*, and these vessels will probably be ready for trial before the end of this fiscal year. Work on the double-turreted monitors *Terror* and *Amphitrite* is so well advanced that, in case of an emergency, these vessels could be prepared for service within a few months.

The armored ram *Katahdin* will probably be completed during the early part of the next fiscal year.

The protected cruiser *Olympia* has been successfully tried and is now practically ready to be commissioned.

The progress of work on the three gunboats, Nos. 7, 8, and 9, now being built at the Newport News Shipbuilding and Dry Dock Company's works, is such as to indicate that they will be completed within the contract time. Such an examination as the Department has been able to make, with the information at its disposal, appears to justify the conclusion that these vessels have been contracted for at a price per ton fully as low as is paid for similar work in France and England.

The progress thus far made in the development of our new Navy is shown in the following table:

FIRST CLASS BATTLE SHIPS.

Name of vessel.	Length on load water line.	Displacement.	Battery.		Condition.
			Main.	Secondary.	
	Ft. in.	*Tons.*			
Iowa	360 0	11,410	Four 12" B. L. R. Eight 8" B. L. R. Six 4" R. F. G.	Twenty 6-pdr. R. F. G. Six 1-pdr. R. F. G. Four Gatlings	Building.
Indiana	348 0	10,288	Four 13" B. L. R. Eight 8" B. L. R. Four 6" B. L. R.	Twenty 6-pdr. R. F. G. Six 1-pdr. R. F. G. Four Gatlings	Do.
Massachusetts	348 0	10,288	Four 13" B. L. R. Eight 8" B. L. R. Four 6" B. L. R.	Twenty 6-pdr. R. F. G. Six 1-pdr. R. F. G. Four Gatlings	Do.
Oregon	348 0	10,288	Four 13" B. L. R. Eight 8" B. L. R. Four 6" B. L. R.	Twenty 6-pdr. R. F. G. Six 1-pdr. R. F. G. Four Gatlings	Do.
SECOND-CLASS BATTLE SHIPS.					
Maine	318	6,682	Four 10" B. L. R. Six 6" B. L. R.	Eight 6-pdr. R. F. G. Eight 1-pdr. R. FG. Four Gatlings	Building.
Texas	301	6,315	Two 12" B. L. R. Six 6" B. L. R.	Twelve 6-pdr. R. F. G. Six 1-pdr. R. F. G. Two Gatlings Four 37-mm. H. R. C.	Do.
ARMORED CRUISERS.					
New York	380 6	8,200	Six 8" B. L. R. Twelve 4" R. F. G.	Eight 6-pdr. R. F. G. Four 1-pdr. R. F. G. Four Gatlings	Flagship North Atlantic Station.
Brooklyn	400 6	9,271	Eight 8" B. L. R. Twelve 5" R.F. G.	Twelve 6-pdr. R. F. G. Four 1-pdr. R. F. G. Four Gatlings	Building.
COAST DEFENSE VESSELS.					
Puritan	289 6	6,060	Four 12" B. L. R. Six 4" R. F. G.	Four 3-pdr, R. F. G. Four 3mm. H. R. C. Four Gatlings	Completing navy-yard New York.
Amphitrite	259 6	3,990	Four 10" B. L. R. Two 4" R. F. G.	Two 6-pdr. R. F. G. Two 3-pdr. R. F. G. Two 37mm. H. R. C.	Completing navy-yard Norfolk, Va.
Terror	259 6	3,990	Four 10" B. L. R.	Two 6-pdr. R. F. G. Two 3-pdr. R. F. G. Two 37 mm. H. R. C. Two Gatlings	Completing navy-yard New York.
Monadnock	259 6	3,990	Four 10" B. L. R. Two 4" R. F. G.	Two 6-pdr. R. F. G. Two 3 pdr. R. F. G. Two 37 mm. H. R. C.	Completing navy-yard Mare Island, Cal.
Monterey	256	4,084	Two 12" B. L. R. Two 10" B. L. R.	Six 6-pdr. R. F. G. Four 1-pdr. R. F. G. Two Gatlings	Pacific Station.
Miantonomoh	259 6	3,990	Four 10" B. L. R.	Two 6-pdr. R. F. G. Two 3-pdr. R. F. G. One 1-pdr. R. F. G.	Under repair.

HARBOR-DEFENSE VESSELS.

Name of vessel.	Length on load water line	Displacement.	Battery.		Condition.
			Main.	Secondary.	
	Ft. in.	*Tons.*			
Katahdin	250 9	2,183		Four 6-pdr. R. F. G.	Building.

PROTECTED CRUISERS.

Minneapolis	412 0	7,375	One 8" B. L. R Two 6" R. F. G Eight 4" R. F. G	Twelve 6-pdr. R. F. G Four 1-pdr. R. F. G Four Gatlings	Building.
Columbia	412	7,375	One 8" B. L. R Two 6" R. F. G Eight 4" R. F. G	Twelve 6-pdr. R. F. G Four 1-pdr. R. F. G Four-Gatlings	North Atlantic Station.
Olympia	340 0	5,870	Ten 5" R. F. G Four 8" B. L. R	Fourteen 6-pdr. R. F. G Six 1-pdr. R. F. G Four Gatlings	Building.
Chicago	325	4,500	Four 8" B. L. R Eight 6" B. L. R Two 5" B. L. R	Ten 6-pdr. R. F. G Four 1-pdr. R. F. G Two 37-mm. H. R. C Two Gatlings	Flagship, European Station.
Baltimore	327 6	4,413	Four 8" B. L. R Six 6" B. L. R	Four 6-pdr. R. F. G Four 3-pdr. R. F. G Two 1-pdr. R. F. G Four 37 mm. H. R. C Two Gatlings	Flagship Asiatic Station.
Philadelphia	327 6	4,324	Twelve 6" B. L. R	Four 6-pdr. R. F. G Four 3-pdr. R. F. G Two 1-pdr. R. F. G Three 37 mm. H. R. C Four Gatlings	Flag-ship, Pacific Station.
Cincinnati	300	3,213	Ten 5" R. F. G One 6" R. F. G	Eight 6-pdr. R. F. G Four-1 pdr. R. F. G Two Gatlings	In commission. Not assigned.
Raleigh	300	3,213	Ten 5" R. F. G One 6" R. F. G	Eight 6-pdr. R. F. G Four 1-pdr. R. F. G Two Gatlings	In commission. Not assigned.
Newark	310	4,098	Twelve 6" B. L. R	Four 6-pdr. R. F. G Four 3-pdr. R. F. G Two 1-pdr. R. F. G Three 37 mm. H. R. C Four Gatlings	Flag-ship, South Atlantic Station.
San Francisco	310	4,098	Twelve 6" B. L. R	Four 6-pdr. R. F. G Four 3-pdr. R. F. G Two 1-pdr. R. F. G Three 37 mm. H. R. C Four Gatlings	Ordered as Flag ship, European Station.
Charleston	312 7	3,730	Two 8" B. L. R Six 6" B. L. R	Four 6-pdr. R. F. G Two 3-pdr. R. F. G Two 1-pdr. R. F. G Four 37-mm. H. R. C Two Gatlings	Asiatic Station.

PROTECTED CRUISERS—Continued.

Name of vessel.	Length on load waterline	Displacement.	Battery. Main.	Battery. Secondary.	Condition.
	Ft. in.	*Tons.*			
Boston	271 3	3,025	Six 6″ B. L. R Two 8″ B. L. R	Two 6-pdr. R. F. G Two 3-pdr. R. F. G Two 1-pdr. R. F. G Two 47-mm. H. R. C Two 37-mm. H. R. C Two Gatlings	Under repair.
Atlanta	271 3	3,025	Six 6″ B. L. R Two 8″ B. L. R	Two 6-pdr. R. F. G Two 3-pdr. R. F. G Two 1-pdr. R. F. G Two 47-mm. H. R. C Two 37-mm. H. R. C Two Gatlings	North Atlantic Station.

CRUISERS.

Detroit	257 0	2,074	Nine 5″ R. F. G	Six 6-pdr. R. F. G Two 1-pdr. R. F. G Two Gatlings	Asiatic Station.
Marblehead	257	2,074	Nine 5″ R. F. G	Six 6-pdr. R. F. G Two 1-pdr. R. F. G Two Gatlings	North Atlantic Station.
Montgomery	257	2,074	Nine 5″ R. F. G	Six 6 pdr. R. F. Two 1-pdr. R. F. G Two Gatlings	North Atlantic Station.

GUNBOATS.

Bennington	230 0	1,710	Six 6″ B. L. R	Two 6-pdr. R. F. G Two 3-pdr. R. F. G One 1-pdr R. F. G Two 37 mm. H. R. C Two Gatlings	Pacific Station.
Concord	230	1,710	Six 6″ B. L. R	Two 6-pdr. R. F. G Two 3-pdr. R. F. G One 1-pdr. R. F. G Two 37 mm. H. R. C Two Gatlings	Asiatic Station.
Yorktown	230	1,710	Six 6″ B. L. R	Two 6-pdr. R. F. G Two 3-pdr. R. F. G One 1-pdr. R. F. G Two 37 mm. H. R. C Two Gatlings	Asiatic Station.
Castine	204	1,177	Eight 4″ R. F. G	Four 6-pdr. R. F. G Two 1-pdr. R. F. G Two Gatlings	Fitting out for South Atlantic Station.
Machias	204	1,177	Eight 4″ R. F. G	Four 6-pdr. R. F. G Two 1-pdr. R. F. G Two Gatlings	Fitting out for Asiatic Station.
Petrel	176	8 92	Four 6″ B. L. R	Two 3-pdr. R. F. G One 1-pdr. R. F. G Two 37 mm. H. R. C Two Gatlings	Asiatic Station.

GUNBOATS—Continued.

Name of vessel.	Length on load water line.	Displacement.	Battery.		Condition.
			Main.	Secondary.	
	Ft. in.	*Tons.*			
Gunboat No. 7	220	1,371	Eight 4" R. F. G One torpedo tube	Four 6-pdr. R. F. G Two 1-pdr. R. F. G Two Gatlings	Building at Newport News, Va.
Gunboat No. 8	250 9	1,392	Eight 4" R. F. G	Two 6-pdr. R. F. G Four 1-pdr. R. F. G Two Gatlings	Building at Newport News, Va.
Gunboat No. 9	250 9	1,392	Eight 4" R. F. G	Two 6-pdr. R. F. G Four 1-pdr. R. F. G Two Gatlings	Building at Newport News, Va.
DYNAMITE GUN VESSEL.					
Vesuvius	252 4	929	Three dynamite 15" guns.	Three 3-pdr. R. F. G	North Atlantic Station.
DISPATCH BOAT.					
Dolphin	240	1,485	Two 4" R. F. G	Two 6-pdr. R. F. G Two 47-mm. H. R. C Two Gatlings	
CADETS' PRACTICE CRUISER.					
Bancroft	187 6	832	Four 4" R. F. G	Two 6-pdr. R. F. G Two 3-pdr. R. F. G One 1-pdr. R. F. G One 37-mm H. R. C Two Gatlings	
TORPEDO BOATS.					
Cushing	138 9	105.3	None	Three 1-pdr. R. F. G	Special service.
Stiletto	88 6	31	None	None	Special service, Newport.
Ericsson	149 7	120	None	Three 1-pdr. R. F	Trial pending.
Torpedo boat No. 3	160	142.38		Three 1-pdr. R. F. G	Plans being prepared.
Torpedo boat No. 4	160	142.38		Three 1-pdr. R. F. G	Do.
Torpedo boat No. 5	160	142.38		Three 1-pdr. R. F. G	Do.

Of the old wooden vessels of the Navy which were in active service at the date of my last report, one, the *Kearsarge*, was wrecked in February last, and her name has since been regretfully stricken from the Navy list. The loss of this historic vessel was reported to you at the time. Congress, sharing in the pathetic affection everywhere felt for the gallant old ship, appropriated a sum of money sufficient, if it could be done, to raise and tow her to a home port. A contract was accordingly made by the Department with the Boston Towboat Company for

this purpose. The company sent a well-equipped vessel to Roncador Reef, the scene of the wreck, and a naval officer was detailed to accompany it as a representative of the Government.

A careful examination made it evident that the vessel could not be raised, and the wrecking party returned to the Norfolk navy-yard, bringing back such articles as they were able to recover from the wreck and surrounding reef. A patriotic American gentleman, Mr. Lloyd Phoenix, afterwards visited, in his yacht, the scene of the wreck and recovered there, and from some of the neighboring islands, a number of interesting relics, which, upon his return to the United States, he presented to the Government. The Department received them with pleasure and thanked Mr. Phoenix warmly.

Credit is also due Mr. Eckford, our consul at Kingston, Jamaica, through whose personal efforts many other interesting articles were recovered and sent to the Department.

It was peculiarly unfortunate that this old ship, historic in battle, should go down upon a well-known reef in a time of profound peace when there was not even a cloud in the sky. The prompt punishment, by sentence of a court-martial of the officers responsible, does not repair the injury. There is still a feeling, deep-seated, widespread, and fully shared by the Navy Department, that *Kearsarge* is a name that ought not to be permitted to die out of the Navy list. I respectfully suggest that you recommend Congress to authorize the construction of a battle ship to perpetuate this name. The Department, it is true, approves the policy heretofore adopted of naming our battle ships for States—the pillars of the Union; but the propriety of making an exception to this rule in favor of the *Kearsarge* would, I believe, be universally recognized.

THE CONSTITUTION.

Under the provisions of the act providing for the furnishing of vessels of war to State governments for the use of the naval militia, the Department has lately been requested to loan the old *Constitution* for such purpose. For many years past this vessel has been used as a receiving ship at the navy-yard, Portsmouth, N. H., has been housed over, and only such repairs put upon her as would render her habitable and in condition to float. Her present state is such that if this famous old ship is to be longer preserved as a memento of our glorious past, a larger sum of money than that appropriated at the last session will be necessary. In view of the memories which are inseparably connected with this vessel, the Department believes that it would be wise for Congress to authorize that she be repaired and put in such condition as will enable the Department to preserve her indefinitely. Should such an act be passed, the old ship might then be brought to Washington, and kept at the navy-yard as an object of interest to the many thousands of patriotic Americans annually visiting the capital of the nation.

STABILITY OF CERTAIN VESSELS.

Shortly before my last annual report was submitted the Department discovered that the *Detroit* and her sister ships, the *Montgomery* and *Marblehead*, and the *Machias* and her sister ship, the *Castine*, all then nearing completion, were deficient in initial stability. In order to obtain positive and accurate knowledge a board, of which Rear-Admiral J. G. Walker, U. S. Navy, was president, and consisting of officers who had been in nowise connected with the designing or construction of these vessels, was appointed to thoroughly examine them and make such recommendations as might be deemed necessary. The finding of this board in regard to the *Detroit* class was made known to you in my report for the year 1893.

The changes recommended in the three ships of this class have been made, and these vessels, now fully equal to the exigencies of the naval service, are in commission. The board recommended removing certain top weights from the *Machias* and *Castine*, placing ballast in their bottoms, and lengthening each of them by 14 feet. This has also been done, and the result of the alterations has justified the wisdom of the recommendations.

The discovery of the errors in the construction of these ships induced the Department to extend the functions of the Walker board, and to order a thorough examination of all vessels then in process of construction about whose stability there could be any possible question. If errors existed in the designs of other ships it was important that the Department should have knowledge of them at the very earliest possible moment. The report of the board was highly satisfactory, and especially so as to the battle ships, the board reporting that:

The result of the inclining experiment of the calculations of these vessels is a most satisfactory and gratifying verification of the results of the original design, demonstrating a remarkable degree of accuracy in the calculations.

The difference between the estimates and the actual result was five-eighths of an inch less metacentric height than designed.

In my report to you for the year 1893 I referred to the report of the commanding officer of the *Detroit* on the seaworthy behavior of that vessel during a heavy gale encountered on her cruise from Fort Monroe to St. Thomas. This evidence of good behavior has been corroborated by a further report of the commanding officer, who stated that-

From repeated observations, taken under ordinary conditions of sea, as well as from opportunities of comparing her movements with the *New York*, *San Francisco*, *Charleston*, and H. M. S. *Sirius* and *Barracouta*, when anchored inside Itacpu Point, near Rio, where a heavy ground swell at times sets in, I am convinced that there are few ships afloat to-day that give as good an account of behavior as the *Detroit*.

This report as to the *Detroit* referred to her as she was before the alterations recommended by the board on stability were made. The additional stability needed and given was required to meet the possi-

ble exigency of being perforated and partly filled with water in battle. The Department apprehends that no difficulties will arise in the future from want of stability in these or any other ships of the Navy. The mistakes made in the construction of these vessels will not be repeated in future, and it is proper to say here, as the very extended information in the Department relating to the construction of ships abroad justifies me in doing, that the success of our naval constructors in designing the ships of our new Navy, as compared with that of designers abroad, has been highly creditable.

WOODWORK.

During the past year I personally visited and carefully inspected many of our new vessels, obtaining always, as far as possible, information in detail in relation to these ships from commanding and other officers. My attention was called during some of these inspections to the belief on the part of some of these officers that much unnecessary woodwork has been heretofore placed in our new vessels. The opinion was advanced that this woodwork was not only expensive and unnecessary, but that it made difficult the thorough inspection and repairing of piping, etc., and, above all, that it would render naval vessels liable to take fire in battle, while the flying of splinters would be dangerous in the extreme.

When our new Navy began to be constructed designers believed it necessary to use woodwork extensively upon the insides of vessels to prevent the accumulation of moisture, and thus to promote the health of officers and crew; but as far back as February, 1892, attention was attracted to the objections to woodwork above enumerated, and also to the fact that theaccumulation of moisture was largely prevented by a proper use of cork paint. Since that date very much less wooden casing and molding has been used in the construction of our new vessels.

Under the belief, however, that the Department could and ought to go very much further in this direction, and desiring to avail myself of the experience acquired with steel vessels in different climates, I addressed letters to many commanding officers and surgeons of ships, asking in detail their opinions as to the extent to which woodwork could be profitably left out of ships. The answers received favor, with great unanimity, the leaving out of woodwork as far as practicable. The reports which have now come from the battle off the Yalu, to the effect that several ships, during that fight, were set on fire by exploding shells, have tended to confirm the opinion that naval vessels ought to carry as little combustible matter as possible. Pending the preparation of orders specifying details, I have directed the suspension, in ships now being built, of all woodwork not absolutely necessary.

The Department has heretofore been, as indicated in my last report, much annoyed by the numerous changes in our vessels which have seemed inevitable during the progress of construction, and which for the most part have proven very expensive. It has therefore taken the

time to design very carefully such vessels as have been recently laid down with the hope of avoiding in future such alterations and changes. Dispensing, however, with all woodwork not absolutely necessary will be in the direction of economy as well as efficiency.

The Department does not dare to express a hope that even by the utmost care and vigilance it can entirely avoid changes of plans while ships are building. Improvements are being invented and suggested day by day, and some of these, no doubt, it will be desirable to adopt. Builders of vessels in the shipyards of England, France, Germany, and Russia, all find themselves annoyed by the delays and expenditures arising from changes of plan during the progress of constructing naval vessels.

With us these difficulties are no doubt enhanced by the fact that we have four separate and distinct bureaus, each concerned more or less with the design and construction of vessels. The Bureau of Construction and Repair designs the hulls of our ships; the Bureau of Steam Engineering, the engines and machinery; the Bureau of Ordnance, the armor and armament, and the Bureau of Equipment, the anchors, chains, galleys, and electric-lighting apparatus. Each of these bureaus attends to its specialties. A natural consequence of this division of work is that each bureau, being intent upon its own designs and devoting its entire energies to them, is anxious above all things to see that that portion of the work which is under its superintendence shall be fully abreast of the times. Add to this the fact that it is often difficult to say where, in the construction of a ship, the duties of one of these bureaus leave off and those of another begin, and some idea is obtained of the difficulties encountered by a Secretary who has cast upon him the duty of reconciling conflicts as they arise and of preventing unnecessary changes.

NAVAL BUREAU SYSTEM.

Our bureau system has justly provoked much criticism in the past. That it has advantages no one can deny. If the lines dividing duties could be always clearly laid down; if conflicts of authority could be avoided; if harmonious and prompt cooperation could always be secured and duplication of work prevented, it would be an admirable system, as the division of labor undoubtedly secures the benefits always resulting in business from specializing work. But there has been in the past so much duplication of work by and so many conflicts of authority between bureaus that Secretaries and naval boards have heretofore many times condemned the system in the strongest possible terms.

Secretary Chandler, following out the recommendations of a board appointed by himself for the purpose, advised that the two bureaus of Construction and Repair and Steam Engineering be united as a single Bureau of Naval Construction. He also strongly favored a "reorganization and concentration of the mechanical departments" in navy-yards, pointing out that there was an almost infinite duplication of

work in these yards, resulting from the bureau system in the Department.

Secretary Whitney, soon after he was installed, took up the question, and, after a thorough study of it, advised Congress to reorganize the Department, vesting all authority under three heads, one to control the personnel of the Navy, another the purchasing of supplies and the keeping of accounts, and the third, everything relating to the construction and repair of ships. The Naval Committee of the House of Representatives promptly reported such a bill as was recommended by Secretary Whitney, and it was, as shown by frequent votes, favored by a large majority of the House of Representatives, but the opposition to it was very determined, and, taking advantage of the dilatory methods then sanctioned by the rules of the House, the opponents of the bill prevented it from reaching a vote.

Secretary Whitney, finding that his scheme of reorganization was not likely to be carried into effect by Congress, under the powers vested in him by law to distribute authority among the several bureaus, began by an order the work of concentrating in the Bureau of Provisions and Clothing jurisdiction over all matters pertaining to purchases and the keeping of accounts. He made at once important and beneficent changes in this respect. And Secretary Tracy, seconded by Congress, carried on this work so successfully that at the beginning of the present administration the Bureau of Supplies and Accounts, the successor of the Bureau of Provisions and Clothing, was found to be in charge of nearly all of the many accounts of the Navy Department.

I have issued certain orders, to be hereafter more particularly alluded to, carrying still further this work of concentrating accounts in one bureau, and it is possible that investigations now being made may justify the Department in making yet other reforms in this direction.

Secretaries Whitney and Tracy also made orders tending to carry out the idea of placing the personnel of the Navy all under one head, and when this administration began the Bureau of Navigation was found to be in charge of practically everything that would have been placed under the head of "personnel" in the bill which the Naval Committee of the House of Representatives vainly endeavored to pass in the Forty-ninth Congress.

If, therefore, everything relating to the construction of a ship, including its machinery, armor, and armament, were now all under one head, the business of the Navy Department would be conducted practically upon the basis contemplated in the bill referred to. The system then sought to be adopted contemplated, of course, that there should be, under the general head of construction, separate chiefs of divisions, who should look after the hull, machinery, armor and armament and electric lighting of a ship. This work must all be, under any system, specialized, the purpose of having all the separate divisions under one head being to secure the harmonious cooperation of the several chiefs. Whether

these heads are called chiefs of bureau or chiefs of division is plainly of little moment, provided only they cooperate on business principles.

The Department for months was engaged in attempting to devise some regulation by means of which, without calling upon Congress for its aid, it might coordinate and unify the work of the chiefs of the four bureaus now concerned in ship construction. The consideration of this question was impressed upon me by the frequently recurring necessity of settling conflicts arising between bureaus as to the manner of performing their several duties.

After much thought I finally issued, on the 2d of October, 1894, General Order No. 433. Under this order the Bureau of Construction and Repair is charged with the responsibility for the design, structural strength, and stability of vessels built for the Navy.

The second paragraph of the order attempts to secure harmony in the preparation of the designs of a new vessel very much after the manner of a regulation issued by Secretary Tracy. The order then goes on to provide that changes in ships from the original designs, of any and every character whatever, whether in hull, machinery, armor, or armament, shall not, with certain minor and unimportant exceptions, be made unless approved by the Department, and that chiefs of bureaus charged with designing or furnishing machinery, armor, or armament, or articles of outfit or equipment, and desiring to make changes therein, shall submit their propositions in writing to the Department through the Bureau of Construction and Repair, which Bureau shall forward such propositions, with its comment, for the action of the Department.

This one bureau is to be, unless its recommendations are overruled by the Department, responsible for the resultant general effect upon the ship of every change that may be made in construction after the designs are approved. The aid of an expert assistant to the Bureau of Construction would enable its chief the more easily to perform the increased duties put upon him by this order. In like manner, if the chief of the Bureau of Construction and Repair desires to make any change in the hull affecting the work of any other bureau, his request that the Department shall sanction such change is to be forwarded, through the bureau affected, to the Secretary for his approval or disapproval.

The effect of this order will be to concentrate under one head full and accurate information as to the nature and extent of every change, however unimportant, authorized to be made in a ship from the time it is laid down until its completion. It fixes the responsibility for the proper correlation of work, and it is believed it will secure in a much greater degree than has been found possible heretofore the harmonious cooperation of all the bureaus that are concerned in the construction of a naval vessel. It is hoped that this order will accomplish in the matter of ship construction, without the abolition of any bureau, similar results to those secured by the orders of previous Secretaries in the matter of bringing the personnel and the supplies and accounts of the Navy, *respectively, under a proper* and efficient control.

ORDNANCE.

The ordnance work at the Washington gun factory has progressed satisfactorily during the past year. Our plant, all of the newest pattern and most approved design, was selected with the greatest care and constructed with commendable foresight. It remains unsurpassed in the world.

From the commencement of the work of manufacturing our modern ordnance the system employed in the construction of guns at this factory has remained unchanged. While the weight of ordnance expert opinion still remains greatly in favor of the gun built up of steel forgings and assembled by heat and shrinkage, the investigation of differing designs has not been neglected, and careful attention is now and will hereafter be given to other systems as they appear, so that at no time will this most important factor in naval warfare be behind that of other nations.

The number of main battery guns required for vessels thus far authorized has not changed from that given in my report of last year. The condition of these guns is as follows:

Caliber.	Sets ordered.	Forgings delivered.	Guns completed to date.	Guns partly completed.	Guns afloat.
4-inch	107	*107	68	20	56
5-inch	86	86	60	26	46
6-inch	141	141	135	6	96
8-inch	68	*68	33	19	22
10-inch	†26	†26		0	10
12-inch	13	10	8	1	2
13-inch	12	12	10	2	0
Total	453	450	340	74	232

* All delivered, but several forgings have been rejected to be replaced by contractors.
† Includes one set of 10-inch forgings assembled as an 8-inch Hurst gun.

Of the twelve 13-inch guns ten have been completed, and the remaining two are in an advanced stage. Of the thirteen 12-inch guns eight have been completed and two of them are now afloat. All of the 10-inch guns have been completed.

The 8-inch nickel-steel gun referred to in my last report has been assembled and is rapidly nearing completion.

NECESSITY FOR SUPPLY OF ORDNANCE.

The guns required for the new vessels heretofore authorized are now so nearly completed that the construction of a sufficient reserve supply should be commenced without delay, and the Department recommends an appropriation to that end.

The most elementary maxims warn us that if it be worth while to maintain a navy at all, we must also have a reserve supply of ordnance and ordnance stores, and certainly we need not call on military science *to tell us that* our reserve of naval vessels is of no value without guns.

Congress should give careful attention to the ordnance requirements of vessels that are liable to be called into service as auxiliaries in time of war, in accordance with the acts of Congress approved March 3, 1891, and May 10, 1892, providing that steamers registered under the provisions of said acts can be used by the United States as transports or cruisers. To mention no others, the Paris and New York, of the American line, are now receiving large sums of money annually on condition that they hold themselves in readiness to serve the Government whenever demanded. When they hauled down the English to hoist the American flag they were receiving pay from the British Government to hold themselves in readiness to serve that nation, and the English had guns and gun mounts ready to be put upon them at a moment's notice. We have now been paying subsidies to these ships for months, and have not a gun to put upon them.

Under treaty provisions neither the United States nor the English can keep more than one small naval vessel upon our Northern lakes. So far the two countries are matched. In case, however, a war should unfortunately break out between them, Great Britain could promptly furnish guns and gun mounts to her merchant marine on the lakes, and though their marine is far inferior to ours in strength, the British might master those waters and do incalculable damage to our lake cities. If we had a reserve of ordnance and ordnance stores we could dominate those waters without question.

The latest and one of the most impressive lessons in all history is now being taught by China and Japan. A nation, the most populous in the world, able to put millions of fighting men into the field, is now, after suffering many disasters, scouring Europe and America for munitions of war. It relied upon its numbers. Now it is buying discarded guns and discarded ammunition, whatever it can get, to aid in repelling the assaults of a nation vastly its inferior in numbers.

SECONDARY BATTERIES.

For the secondary batteries required for vessels heretofore authorized 596 guns have thus far been ordered, the type and number being as follows:

Caliber.	Type.	Ordered.	Completed.	Not yet completed.	In service afloat.
37-mm	Hotchkiss	77	77	.....	50
47-mm	....do	18	18	.....	8
1-pdr., light	....do	18	18	.....	16
1-pdr., heavy	....do	118	93	25	41
3-pdr	....do	38	38	.....	33
6-pdr	....do	162	152	10	88
1 pdr., heavy	Driggs	15	15	.....	4
3-pdr	....do	10	10	.....	2
6-pdr	....do	140	125	15	44
Total		588	546	50	286

Experience thus far gained has suggested numerous improvements of more or less value in these two types of rapid-fire guns, and such improvements will, whenever they are of sufficient importance, be embodied in the guns to be constructed hereafter. As other types are patented and brought to the attention of the Department they will be tested, so that no manifest advance in the direction of efficiency will be lost to the service. The Department will, however, be careful not to unnecessarily multiply types of guns, bearing in mind the consequent inconveniences in the way of supplying ammunition, handling, etc.

During the past year the development of rapid-fire guns abroad has been in the direction of an increase in numbers, with an extension of the system to guns of higher calibers, and the Department has been at work on similar lines. It is difficult to overestimate the advantages of rapid fire.

GUN MOUNTS.

Careful attention is being given to the subject of gun mounts, particularly those for the higher calibers of main battery guns. The recoil energy of the modern high power great gun is tremendous, and it has required much laborious study to construct efficient mounts to take it up. The Department is making every effort to expedite work in this direction. Reports thus far received show the designs adopted to be satisfactory.

Four 13-inch mounts for the *Indiana* are nearly completed. The 12-inch mounts for the *Puritan* and *Texas* have been completed. The 10-inch mounts for the *Maine* and *Amphitrite* have been finished and have undergone successful proof trials. The first of the 8-inch spring return turret mounts, referred to in my report of last year, has been constructed and is now undergoing trial at the naval proving ground.

In the smaller mounts many improvements have been made, and some new designs have also been considered with a view to experimenting with them in future. With those under construction considerable difficulty has been experienced in obtaining good steel castings from the makers. On one contract the rejections amounted to about 40 per cent of the castings delivered. The acceptance tests are of necessity severe, but notwithstanding this the number of firms now able to supply castings of the required quality has increased from one in 1887 to not less than seven at the present time. Competition between these firms is very keen, and this, in connection with greater experience in manufacture, increased facilities for the work, and, possibly, a diminution of profit, has led to a material reduction in cost.

At the same time, however, the temptation to evade the specifications and deceive the inspectors in passing upon material appears to have increased. During the year a number of castings submitted by two contractors were found to contain defects which had been, in the

opinion of the Department, fraudulently concealed from the inspectors. One of these contracting companies endeavored to secure the acceptance of castings which had been previously rejected by returning them so marked as to indicate that they were not the castings that had once been refused. After a careful investigation, I decided to place these matters in the hands of the United States district attorney of the district in which they occurred for prosecution.

Since the discovery of these and the frauds committed at the Carnegie works, as to which full and complete reports were heretofore made, the system of inspection originally authorized by the Department has been improved in several respects; indeed it was the greater vigilance to which employés had been stimulated by the frauds at Homestead that led to the discovery of the later attempts to impose on the Government.

At the present time 418 mounts have been ordered for main battery guns of all calibers, of which number 280 have been completed, 42 are in course of completion, and 96 have not yet been commenced.

Naval authorities abroad have lately been giving much attention to the subject of mounts for high-angle firing, such mounts being designed to meet the requirements of offensive operations against modern systems of coast and harbor fortifications erected upon elevated positions.

POWDER.

The question of powder for high power guns is one of grave importance, and is receiving the most careful attention of our ordnance experts. E. I. Dupont de Nemours & Co. are still experimenting with brown prismatic powders for the 12-inch and 13-inch guns. The California Powder Company of Santa Cruz, has supplied the Department with a very satisfactory brown powder for the 5-inch rapid-fire guns, in consequence of which an order has lately been placed with this firm for powder for guns of larger calibers. The re-tests of several lots of brown powder, which had been stored for several years in the magazines of cruising vessels, showed very satisfactory results, particularly as to keeping qualities.

The manufacture of smokeless powder at the naval torpedo station, Newport, R. I., is still progressing satisfactorily, the resulting powders showing ballistic and keeping qualities quite equal to those which have been adopted for service use by foreign powers. Smokeless powders from abroad have also been tested, but none have given satisfactory results.

PROJECTILES.

With the exception of common shells for 13-inch guns, the number of projectiles already ordered will suffice to complete the outfits of all ships thus far authorized.

The higher development of armor-piercing projectiles, necessitated by the advent of hard-faced armor, is being carefully sought after, and all possible *encouragement has been* given to projectile makers. Of

the different types already experimented with, some cast-steel projectiles of large caliber, made by J. G. Johnson & Co., of Spuyten Duyvil, N. Y., have given very satisfactory results, such as to indicate that as good a projectile can be made of cast steel, properly treated, as has yet been produced by forging. If subsequent experiments bear out this conclusion, the cost of projectiles will be materially decreased.

Up to the present 9,722 armor-piercing projectiles, of calibers from 4-inch to 13-inch, both inclusive, have been ordered, of which all but 150 have been delivered. In a short time all outstanding contracts will have been filled, and the Department will then, if Congress makes the necessary appropriation, contract for the manufacture of a reserve supply of projectiles for all calibers, to be held available for any sudden emergency.

Practical experiments have been carried on during the past year with an 80-pound 6-inch shell, containing 11 pounds of wet gun cotton, with a dry gun-cotton primer and a fulminate detonator. The velocity attained was about 1,400 foot seconds, which, at the maximum elevation usually attainable from ships' sponsons or turrets, would give a range of not less than 3 miles. The results obtained were so favorable as to lead to continuing the experiments with a 10-inch shell, containing about 70 pounds of gun cotton, and fired with a charge giving an initial velocity of about 1,700 foot seconds, sufficient, at the maximum elevation attainable from closed turrets, to give a range of over 4 miles.

SMALL ARMS.

As was stated in my last report, this Department adopted a caliber of 6 mm. (0.236) for the new Navy rifle. During the past year exhaustive experiments have been conducted with a view to the determination of the length and metal of barrel, the most suitable powder charge, and all the other essential features of the modern rifle, these conditions to be observed in competitive trials which the Department has decided to conduct prior to adopting a type of small arm for the Navy.

In the experimental firings with the new rifle, muzzle velocities of about 2,900 foot seconds were attained; but a charge of 36 grains was finally fixed upon in order to keep the chamber pressure well within a safe limit, and also to increase the lifetime of the rifle barrels. This charge gives a muzzle velocity of 2,500 foot seconds. With this velocity the point-blank range is about 700 yards, and the effective range fully 4,000 yards. At short range the penetration is about 5 feet of pine wood. The enormous increase of effectiveness over the old-fashioned rifle is apparent from these figures.

SUBMARINE TORPEDO BOATS.

After the date of my last report, exhaustive practical experiments were conducted to determine the effect upon the crew of a submerged

boat of the detonation near by of a high explosive under water. These experiments were carried on at the naval torpedo station at Newport, R. I., by exploding gun-cotton charges at various distances from a submerged structure containing living animals.

An old Lay torpedo, about 28 feet long, was submerged 15 feet, and 80-pound charges (dry weight) of gun cotton moored at the same depth were detonated at the following distances from it: 431 feet, 305 feet, 200 feet, 150 feet, 100 feet, and 80 feet. The first experiment resulted in sinking the boat, drowning the contained animals; but it was found on raising that no injury had been done to the boat by the explosion beyond opening the seams, causing leakage with resultant sinking, and after slight repairs the other experiments were carried out, the boat being raised after each explosion and the animals examined. It was not until the 80-foot distance was reached that there were any signs of injury to the hull of the boat. At this distance the explosion made a number of depressions in the hull and it was clear that at a slightly shorter distance the plating would have been completely ruptured. No damage, however, was done to the inmates, and, consequently it was demonstrated that the shock of an explosion upon the crew of a submarine boat will be harmless, so long as it is insufficient to rupture the hull of the boat itself. That these experiments do show that the danger to a submarine vessel from the detonation of submerged high explosives is an element to be considered in solving the problems entering into the construction of such a vessel is, however, very apparent.

That such a boat if successful would be an important factor in naval warfare is self-evident, but after a careful study of results obtained at home and abroad, in connection with the almost insurmountable difficulty of definitely directing such a craft under water, I again referred the question to a board for an exhaustive examination. The report of this board, which was, in the main, favorable, is now receiving the careful consideration of the Department.

AUTOMOBILE TORPEDOES.

Important improvements have been made in the Howell torpedo which have resulted in making the explosive more efficient. Two of the 30 originally ordered have been accepted, and 21 are undergoing acceptance trials. The remainder will be ready for testing within a few weeks. The trials thus far conducted having proved satisfactory, the Department, in accordance with the provisions of the contract, has increased the number of torpedoes to be supplied from 30 to 50.

All of the Whitehead torpedoes called for in the contract of May, 1891, with the E. W. Bliss Company have been completed, and carefully conducted trials have, it is believed, shown them to be equal to the very best made abroad. The Department entered into a contract with this company for fifty additional torpedoes of an improved type to be

designated as "Mark II." Twenty of these have already been delivered.

Nearly all of the launching apparatus connected with these two types of torpedoes have been delivered by the contractors.

ARMOR CONTRACTS.

The progress made in this country in the manufacture of armor has been remarkable. To make such armor requires workmen of skill and experience and a plant costing millions of dollars. Two great armor manufacturing plants have been established in this country. The very first plates produced are believed to have been equal to any then turned out in the oldest establishments of Europe. The Department, however was not satisfied with this. It demanded improvement upon European armor, and improvements were made, first by the introduction of an admixture of nickel with the steel and, secondly, by face-hardening by means of the Harvey process. Thus, it is believed, our armor became very early in the process of its manufacture, far and away the best in the world. European nations are now adopting similar methods.

As both the establishments making armor for us now have their plants in operation and their skilled workmen assembled, ready, with the experience they have acquired, to continue the manufacture, the question seems to present itself for immediate solution, shall Congress authorize any more armored vessels? If not, we need not concern ourselves with the future of these plants; but if we are to have more armored vessels, then it would appear that we should make other contracts for armor while these two establishments are still in working order and their skilled operatives are assembled.

U. S. S. VESUVIUS.

The act making appropriations for the naval service for the fiscal year ending June 30, 1895, contained a provision authorizing this Department to transform the *Vesuvius* into a torpedo cruiser, if in the opinion of the Secretary of the Navy such transformation would add to the value of this vessel for naval purposes. The matter is still under consideration.

MOVEMENTS OF SHIPS IN COMMISSION.

Since the date of my last report the vessels of the Navy in commission have been almost constantly employed, and the necessity for such employment seems to be continually increasing. Heretofore an insufficiency of numbers has, in cases of sudden emergency abroad, necessitated sending vessels from one station to another, frequently for long distances. Now, however, that all the cruising vessels of the new Navy are, with but few exceptions, completed and most of them ready for active service, I have decided in the interest of economy and efficiency, and for the more perfect protection of our interests abroad, to put

into operation a policy which will keep a number of cruising vessels sufficient for the ordinary needs of naval policing on each of six stations, viz: North Atlantic, South Atlantic, North Pacific, South Pacific, Asiatic, and European.

This policy will allow frequent fleet and squadron evolutions, which are absolutely necessary for the instruction of officers and men. To the North Atlantic, or home squadron, a sufficient number of vessels will be assigned to permit of a number being employed in practical exercises connected with the course of instruction at the Naval War College. Vessels fitting out on this coast will generally remain attached to the North Atlantic squadron for the first six months of their cruise, for purposes of instruction and to enable officers and men to familiarize themselves with their ships. The home squadron will thus become the feeder for all the other squadrons.

The North Atlantic squadron, under the command of Rear-Admiral A. E. K. Benham, was actively employed on the Atlantic coast, in the Gulf of Mexico, and in the Caribbean Sea until December last, when Admiral Benham was ordered to Rio de Janeiro. Reaching that port January 12, 1894, he assumed temporary command of a fleet consisting of the first-rate armored cruiser *New York*, the second-rate protected cruiser *San Francisco*, the second-rate protected cruiser *Charleston*, the second-rate protected cruiser *Newark*, the third-rate cruiser *Detroit*, and the fourth-rate wooden gunboat *Yantic*, all but the latter being under his immediate command in the harbor. This was the most powerful fleet the United States has had in foreign waters for many years. The vigorous protection of American interests by Rear-Admiral Benham afforded results that were immediately apparent, and it is believed that his decided action, which met with such universal approval, will have a far-reaching and wholesome influence in quite a number of countries where revolutions are so frequent as to almost constantly imperil the rights of American citizens.

In March, the insurrection in Brazil having been suppressed by the government, Admiral Benham proceeded north in his flagship, the *San Francisco*, and hauled down his flag in the West Indies the following month, to go on the retired list. The *New York* and *Detroit* were afterwards ordered to proceed to the North Atlantic Station, and the *Charleston* to the Pacific. The *Newark* and *Yantic*, which are now the only vessels on the South Atlantic Station, will shortly be reinforced by the *Castine*.

Rear-Admiral O. F. Stanton, in command of the South Atlantic Station at the date of my last report, was ordered home in December last, and shortly afterwards assumed command of the North Atlantic Station, which command he retained until he was retired and relieved by Rear-Admiral R. W. Meade, in August last. The vessels on this station at present are the *New York* (flagship), *Columbia*, *Atlanta*, *Montgomery*, *Marblehead*, and *Vesuvius*. The *Cincinnati* and *Raleigh* are in commission and *unassigned*.

The *Bennington* has been transferred to the Pacific Station, thus leaving the *Chicago* the only vessel doing service in European waters and she will shortly be relieved by the *San Francisco*.

The vessels on the Pacific Station at present are the *Philadelphia* (flagship), *Monterey*, *Bennington*, *Mohican*, *Alert*, and *Ranger*. The *Yorktown* and *Charleston* have been lately detached from this squadron and ordered to the Asiatic Station. The *Marion* will be added to the squadron as soon as commissioned. The operations of the vessels composing the Bering Sea fleet are referred to elsewhere.

The vessels on the Asiatic Station are at present the *Baltimore* (flagship), *Charleston*, *Concord*, *Monocacy*, and *Petrel*. The *Detroit*, *Yorktown*, and *Machias* have been ordered to Asiatic waters, and the two former are now en route.

Instructions have been issued to the admiral commanding in Asiatic waters which, it is believed, will secure the utmost possible protection to American interests, and explicit directions have been sent both to the commanding officer of the fleet and to the intelligence officers on board the several vessels there as to the manner in which they are expected to collect all such information as can be derived from the results of naval operations carried on in those waters. Valuable reports from these officers are already beginning to arrive.

The *Thetis* has been engaged in surveying work on the Pacific coast of Central America. The *Pinta* has continued on special service in Alaskan waters and the *Michigan* on the lakes. The Training Squadron has made the usual practice cruises during the year. The *Monongahela* and *Bancroft*, with the naval cadets on board, made the usual summer practice cruise.

The Department takes pleasure in testifying to the ability, zeal, fidelity, and general efficiency of the naval officers in command abroad during the past year in such cases as required their active intervention for the protection of American interests. The reports of incidents were generally clear and explicit, evidencing a high degree of training for the duties they have to perform.

POLICY OF NAVAL CONSTRUCTION ABROAD.

In general the policy of naval construction now in operation by the principal foreign naval powers remains practically the same as outlined in my last report. The sizes of vessels are about the same, with a tendency to adhere to the largest.

In England a shipbuilding programme was authorized five years ago, directing the construction of 70 vessels. These vessels having been practically completed, a new programme has been authorized this year, looking to the construction of a total of 110 vessels of all classes, including 10 battleships, first class; 6 battleships, second class; 33 cruisers; some smaller vessels, and a large number of torpedo boats, the construction of which is to extend over a period of five years. The

first-class battleships are to be of about 14,900 tons displacement; the second-class battleships of about 6,000 tons displacement, and the largest of the cruisers are to be of about 14,200 tons displacement.

In 1891 France adopted a shipbuilding programme which called for a total of 81 new vessels, of which 10 were to be armored, 50 were to be cruisers, and 21 to be torpedo vessels and smaller craft, the construction to extend over a period of ten years. This programme is being carried out on the original lines.

The torpedo vessels now building abroad range from 500 to 925 tons displacement, and altogether 16 are under construction. One of the most notable things in the policy of foreign construction is that which indicates the building, in general, of a number of torpedo boats equal to the total number of all other vessels authorized. In order to give you a clear idea of the condition of the navies of foreign powers at the present time, with reference to effective war vessels only, I have the honor to call your attention to the following table:

General condition of foreign navies.

ARMORED.

Nations.	Battle ships.		Coast-defense vessels.		Cruisers.		Total armored.	
	In service.	Authorized and building.	In service.	Authorized and building.	In service.	Authorized and building.	In service.	Authorized and building.
Argentine	1	.....	4	.....	.....	.....	5	.....
Austria	6	.....	.....	3	4	.....	10	3
Brazil	2	.....	2	2	.....	.....	4	2
Chile	1	.....	1	.....	1	.....	3	.....
China	2	.....	3	.....	.....	.....	5	.....
Denmark	1	.....	6	1	1	.....	8	1
England	43	10	12	.....	18	.....	73	10
France	18	12	21	1	4	7	43	20
Germany	13	1	17	2	2	.....	32	3
Greece	3	.....	.....	.....	2	.....	5	.....
Holland	.....	.....	25	3	.....	.....	25	3
Italy	9	9	5	.....	4	1	18	10
Japan	.....	2	3	.....	2	.....	5	2
Portugal	.....	.....	1	.....	.....	4	1	4
Russia	8	9	23	3	9	2	40	14
Spain	1	.....	5	.....	2	6	8	6
Sweden and Norway	.....	.....	20	1	.....	.....	20	1
Turkey	7	.....	4	.....	7	2	18	2
Total	115	43	152	16	56	22	323	81

General condition of foreign navies—Continued.

UNARMORED.

Nations.	Cruisers protected.		Cruisers.		Gun vessels.		Torpedo vessels.		Total unarmored.	
	In service.	Authorized and building.	In service.	Authorized and building.	In service.	Authorized and building.	In service.	Authorized and building.	In service.	Authorized and building.
Argentine	3	.....	3	.....	13	.....	2	.....	21	.....
Austria	6	.....	12	.....	10	.....	7	.....	35	.....
Brazil	3	.....	7	.....	1	.....	1	.....	12	.....
Chile	4	.....	3	.....	.....	.....	2	.....	9	.....
China	5	3	13	2	41	.....	1	.....	60	5
Denmark	5	1	1	.....	11	.....	2	.....	19	1
England	59	33	85	15	60	.....	34	.....	238	48
France	16	14	35	1	80	5	16	4	147	24
Germany	4	.....	13	1	4	.....	18	.....	39	1
Greece	.....	2	2	2	12	.....	1	.....	15	4
Holland	1	.....	13	.....	55	1	1	.....	70	1
Italy	12	5	16	1	30	.....	14	4	72	10
Japan	7	1	10	.....	5	1	1	.....	23	2
Portugal	.....	.....	6	1	40	2	.....	.....	46	3
Russia	1	.....	25	.....	13	.....	13	2	52	2
Spain	4	2	15	.....	63	23	8	3	90	28
Sweden and Norway	1	.....	7	.....	43	.....	3	.....	54	.....
Turkey	.....	2	8	4	9	9	.....	3	17	18
Total	131	63	274	27	490	41	124	16	1,019	147

Nations.	Summary.		Torpedo boats.	
	In service	Authorized and building.	In service.	Authorized and building.
Argentine	26	.....	22	.....
Austria	45	3	64	.....
Brazil	16	2	22	.....
Chile	12	.....	22	Some.
China	65	5	83	5
Denmark	27	2	29	.....
England	311	58	175	64
France	190	44	217	42
Germany	71	4	119	8
Greece	20	4	51	.....
Holland	95	4	39	3
Italy	90	20	178	11
Japan	28	4	26	23
Portugal	47	7	10	.....
Russia	92	16	163	14
Spain	98	34	25	25
Sweden and Norway	74	1	53	.....
Turkey	35	20	23	3
Total	1,342	228	1,321	198

This table shows the total number of vessels now authorized to be 228, the proportion of different types of which is worthy of attention, being as follows:

	Per cent.
Battle ships	18.9
Coast defense vessels	
Armored cruisers	9.6
Protected and unprotected cruisers	39.5
Gun vessels	18
Torpedo vessels (not torpedo boats)	

It will be observed that the generally recognized policy of having two cruisers to each battle ship is here carried out.

PERSONNEL.

Again I feel it my duty to call your attention to the great and pressing need for Congressional action in reference to the personnel of the line of the Navy. The evils presented in my last report are even greater to-day than then, and will increase until the situation becomes so serious that only the most stringent, far-reaching, and harsh measures will suffice to remove them.

The joint commission from the Committees on Naval Affairs of both Houses, referred to in my last report, had the entire subject of the personnel under consideration during the greater part of the first session of this Congress, during which plans were presented by myself and officers of the various corps of the Navy looking to a thorough reorganization. It is hoped that the labors of this commission will be completed in time to enable them to make a report to both Houses at the beginning of the coming session, and I can not too strongly urge that the matter be taken up and settled before the conditions become so serious as to practically menace the efficiency of the naval service.

ENLISTED MEN.

I again renew my recommendation of last year that the enlisted force be increased by 2,000 men. A careful study of the services of the Navy for several years past convinces me that the number of vessels which must be kept in commission and ready for service is greater than the present enlisted force allowed the Navy will suffice to man. Calculations place this increase at not less than 2,000 men, and the law to authorize such increase should be so worded as to permit the Department to enlist them whenever needed.

An efficient and economical service can not be carried on without a fair margin between the number of men absolutely necessary to man the ships in commission and the limit as fixed by law. New ships getting ready for service and constantly recurring emergencies necessitating the dispatch of vessels to foreign waters are causing demands upon the enlisted force which the Department will very shortly be unable to meet. The expense of maintaining the additional number of men

asked for will be small in comparison with the results to be obtained and the value of public property of which they become the care-takers and defenders.

Our new ships, too, will be of little value without officers and men trained in exercising them. This should not, however, be for a moment understood to mean that the vessels now building and those the Department is asking for in this report ought all of them to be kept constantly in commission. Battle ships and coast-defense vessels, as well as other ships, should be kept as nearly as may be always ready for service. Armored ships, however, and some of the larger cruisers, like the *Minneapolis* and the *Columbia*, it would be desirable to keep cruising in our own waters for not less than one year out of three. When not cruising they might be laid up in fresh water under care-takers who would maintain them in condition. Experience is demonstrating that long cruises by our largest vessels are expensive, and there is no question but that smaller vessels better subserve all the purposes of cruising in foreign waters for the protection of American interests in time of peace. Economy is not to be lost sight of by those who would befriend the Navy. Its affairs should be so administered as to entitle it to the continuing support of a people whose patriotism may always be relied upon to respond to every reasonable demand.

If the naval policy I have here ventured to indicate and briefly outline be carried out there will be no necessity, unless in case of war, to increase the force of enlisted men beyond that now requested for many years to come. This will make the total number of men authorized 11,000.

SERVICES OF NAVAL FORCES ASHORE.

During the labor disturbances in California, and in accordance with directions from you, three battalions of sailors and marines were landed from the *Charleston*, *Monterey*, *Thetis*, and *Independence*, all under command of Lieut. Commander W. H. Reeder, U. S. Navy. A force of marines from the Mare Island navy-yard, under the command of Maj. Pope, was also sent to the scene of the troubles. I take pleasure in informing you that the brigadier-general commanding the Department of the Pacific, under whose command they were placed, bore high testimony to the importance and efficiency of the services rendered by these forces.

NAVAL WAR COLLEGE.

For some years after the subject was first brought to my attention I was not inclined to believe that the advantages to be derived from a war college as it was established were sufficient to justify the expenditure necessary to keep it in operation. A visit, however, to that institution at Newport, in the summer of 1893, and a careful study of the whole subject sufficed to change my convictions on the subject. I

had been disposed to regard the institution as establishing a kind of post-graduate course for the prosecution of higher education in the sciences. If such was its real purpose it should, of course, be located at Annapolis, and should use the plant upon which the Academy is founded. Its proper purpose, however, is the study of strategy and tactics, the solution of war problems as affected by modern naval appliances, questions which can only be taken up with advantage by officers of more or less experience. My careful examination of this whole question greatly impressed me with the importance of at once establishing the institution upon a firm and substantial basis and at the same time marking out and limiting within proper bounds its scope and general purposes.

With these ends in view the Department detailed Capt. H. C. Taylor, U. S. Navy, as the president of the institution, and afterwards approved a theoretical and practical course of instruction prepared by him. Under the able supervision of this officer the results obtained during the session beginning June 12 and ending September 29 were very satisfactory and clearly demonstrated the wisdom of the Department's action. Quite a number of officers were detailed to attend the college and participate in its exercises. Able and exhaustive lectures were delivered on sea power, naval tactics, naval ordnance, signaling, fleet manœuvers, torpedoes, tactical and structural questions, electricity, naval hygiene, coast defense, and international law. In addition to these lectures, a feature of the course this year was the study of war problems, specially selected from their natural application to possible future necessities of offense and defense.

A very interesting and useful exercise was the preparation of tactical plans for the defense of the principal strategical strongholds on our Atlantic coast, the results of which have been embodied in war charts and defensive plans of the localities studied. In order to make these complete, comprehensive, and of actual future value, many of the officers of the class were sent to make personal observations of the places under consideration. Another feature, and one of great interest, was embodied in a series of war games, representing respectively duels between single ships, engagements between two fleets and strategical games in which all the operations of a foreign war were considered. It gives me great pleasure to note the interest displayed by the officers of the class. I attended one of the lectures last summer, and conversations with a number of the officers convinced me that they were all cooperating heartily with Capt. Taylor in attempting to solve the complex problems of modern naval warfare.

It had been the intention of the Department to supplement and connect this course of instruction at the college with practical exercises afloat on the vessels of the North Atlantic Squadron, but the exigencies of the service in foreign waters and the fact that many of our new vessels were not yet completed compelled the Department to forego

this desirable practical cooperation. It is the intention of the Department to have such cooperation when possible in the future.

The course pursued at the War College has attracted favorable attention and many complimentary notices abroad. During the past season two officers of the Swedish navy, by permission of the Department, attended its exercises.

It gives me pleasure to call your attention to the very able report of the War College in the appendix.

UNITED STATES NAVAL OBSERVATORY.

For many years past it has been asserted by scientists that the astronomical work of this institution should be under the direct control of a practical astronomer. The argument has been, and there has always been more or less foundation for it, that naval officers were not well fitted to fill the position because of their technical education in other directions, and also that the director of the work should be permanent in his position, and not subject to be changed at intervals, as are naval officers. Basing themselves upon these two propositions, certain of these gentlemen have been for years asking Congress to place the Naval Observatory, plant and all, under the control of a civilian. Much of the work done at the Observatory now is purely nautical, and the buildings were erected not only for astronomical but for nautical purposes. Nautical work can best be, and undoubtedly always should be, done under naval officers. No argument is made that this part of the work should be transferred.

The Nautical Almanac, under the management of Prof. Newcomb, is also correlated with and, to some extent, dependent upon the purely astronomical work of the Naval Observatory, yet no argument is or can be made that this work should be transferred. Every scientist in America is proud of the reputation that Prof. Newcomb has made throughout the world; and the excellence of the Nautical Almanac is beyond question. I have recently assigned quarters in the Naval Observatory building to Prof. Newcomb and his force.

The work done at the Observatory now, therefore, consists of, first, the purely nautical work, which should always be in charge of naval officers; secondly, the Nautical Almanac work, always heretofore well done under the Navy Department; and, thirdly, the purely astronomical work.

After giving much thought to the subject and carefully weighing the force of all the arguments heretofore made before Congress and elsewhere against the system hitherto pursued of placing the purely astronomical work directly under a naval officer, who is Superintendent of the Observatory, I concluded to vest, as I had authority to do without Congressional action, a chief astronomer with entire control of the purely astronomical work of the Observatory. As Prof. Newcomb has heretofore so efficiently carried on the Nautical Almanac, being allowed *himself to control his* work, it would seem that an astronomer at the

head of the purely astronomical work of the Observatory ought, in like manner, to succeed in that work. Under the reorganization made by order dated the 21st day of September, 1894, Prof. Harkness, nominally a professor of mathematics, but really for many years an astronomer, and now senior of the professors, is placed in efficient control. This order answers every purpose sought to be subserved by the bill now pending before Congress to authorize a civilian head of the Observatory, except that the Secretary is limited in his choice of a director to the astronomers now in the Navy.

Prof. Harkness is an officer of scientific attainments and long experience. Under existing laws he will be retired on the 17th day of December, 1899. Whether Congress shall give to the Secretary of the Navy or the President the power to appoint a director of Astronomy at the end of Prof. Harkness's term, or even now, is a question for that body to consider. Prof. Harkness is believed to be fully competent to discharge the duties of the high position to which he has been assigned. Whatever Congress may do, however, in so far as regards conferring the right to appoint a director from civil life, the Department is firmly convinced that no law ought to be passed going further than this.

The three divisions of the Naval Observatory, considered as a station, and the Naval Observatory plant, taken as an entity, should always be under the control of a naval officer. If the Observatory, as a whole, were to be placed under the control of a civilian, the Navy would need other buildings and other plant for its purely nautical work now carried on there, and past experience shows that civilian institutions established under the Government are apt to grow without limit.

NAVAL MILITIA.

Interest in the naval militia continues unabated, and it is apparent to the Department that its efficiency has materially increased within the past year. During this period organizations have been perfected in Michigan and Connecticut, and the formation of others has been authorized by the legislatures of Vermont, New Jersey, Virginia, and Georgia.

At the present time the number of officers and men of the various States mustered in and serving is as follows:

Massachusetts	448
Rhode Island	113
Connecticut	65
New York	442
Pennsylvania	217
Maryland	128
North Carolina	168
South Carolina	208
California	320
Illinois	36
Michigan	73
Total	2,549

During the first session of the present Congress an act was passed to promote the efficiency of the naval militia, which contained provisions authorizing the loan by the Department of such vessels, boats, and equipments as are not required for the general service, on the requisitions of governors of States possessing regularly organized naval militia. Under this act the Department has already provided for loaning vessels as follows:

The *New Hampshire* to New York.
The *St. Louis* to Pennsylvania.
The *Wyandotte* to Maryland.
The *Nantucket* to North Carolina.
The *Swatara* to California.

The movement is still in its infancy, and certainly promises gratifying results, but the exact relations of the naval militia to the regular service, and how the two shall best and most efficiently cooperate in any regular plan of national defense, is not as yet distinctly marked out. There are, however, undoubtedly many directions in which the splendid bodies of young men now being organized can in case of need render effective service. We are at present affording them the fullest opportunities for an acquaintance with the service and its requirements, leaving it in great measure to themselves to decide upon what will be the best and most practicable field for their conjunction with the Navy. The Department will continue to extend all the material aid in its power, and will always be ready, by suggestions and otherwise, to assist in perfecting any plans that may promise to secure the helpful and harmonious cooperation of the militia with the regular Navy.

It is noticeable that this movement has developed rare strength and enthusiasm along the great lakes and rivers on our Northern frontier. It is also rapidly crystallizing and increasing on our Western coast, and it is hoped that the authorities of the South Atlantic and Gulf States will encourage the splendid personnel which is there ready to be organized. Laws have been passed in many of those States creating a naval militia.

The policy of the Department, as defined in my last report, in regard to affording these organizations opportunity for drill and instruction during the summer months has been carried out again this year. It is gratifying to state that these exercises were conducted in a systematic manner, and the results have been very satisfactory to the Department.

The annual drills and target practice of the Massachusetts militia took place on the *Miantonomoh* and *Atlanta*, and were supplemented by an encampment on Lovell's Island in Boston Harbor.

The Rhode Island divisions were given a four days' course of instruction on the *Miantonomoh*. The Connecticut militia had a similar course of training on the *Atlanta* in Long Island Sound. The various divisions of the New York militia had a week of instruction on the *New York* and *San Francisco*, in and about Gardiner's Bay, Long Island. The Pennsylvania organizations from Philadelphia and

Pittsburg were given a practical course of drills and exercises at sea on the *New York*.

The battalion of North Carolina had an opportunity for instruction and target practice on the *Montgomery* in connection with practical exercises on board the monitor *Nantucket*. The Michigan division had an instructive tour of duty on the steamer *Michigan* on the lakes.

In the appendix will be found extracts from reports made by boards of officers specially detailed for the purpose, which are of great interest as showing not only the proficiency of these bodies, but also the deep and active interest taken in the new Navy by Americans of all professions and occupations.

The subject of the naval militia has been entirely under the direction and control of Assistant Secretary McAdoo, whose valuable aid in the many matters committed to his charge I take great pleasure in acknowledging.

OPERATIONS IN BERING SEA.

The Department issued the necessary instructions on the 13th of April, 1894, for the formation of a fleet, consisting of the U. S. S. *Mohican*, *Concord*, *Yorktown*, *Alert*, *Ranger*, *Adams*, and *Petrel*, the revenue cutters *Rush*, *Corwin*, and *Bear*, and the Fish Commission steamer *Albatross*, to be under the command of Commander C. E. Clark, and to cruise in the North Pacific and Bering Sea in order to carry out the provisions of the award relating to fur seals rendered by the Tribunal of Arbitration at París, under the treaty between the United States and Great Britian, concluded at Washington, February 29, 1892. The revenue cutters and the Fish Commission steamer had been temporarily transferred to this Department by your order.

The *Mohican*, *Yorktown*, *Adams*, *Alert*, *Albatross*, and *Corwin* assembled at Port Townsend, from which place the last of these vessels sailed on the 17th of May, to cruise in the North Pacific and Bering Sea. The *Petrel* and *Concord*, transferred from the Asiatic Station, reported for duty with the fleet at Unalaska by the 29th of May. The *Bear* sailed from San Francisco May 5, for a cruise in the Arctic, and joined the fleet at Unalaska on the 21st of September. The duties of the vessels attached to this fleet required them to warn all British and United States vessels or persons not to seal within the area prohibited by the award, during the period of time in which fur-seal fishing is forbidden, and to seize all vessels found to have violated the provisions of the law; to enforce the provisions of the Revised Statutes in regard to the transhipment of cargoes within the waters of the United States; to gather such hydrographic information as might be of use in correcting the imperfect charts of Bering Sea, and to collect such data as it was practicable for them to obtain in regard to the habits and customs of the fur seals without killing them.

Certain British war vessels cooperated with ours in carrying out the concurrent regulations for the enforcement of the provisions of the award.

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For the *Catalpa:*	
M. H. Gregory, Great Neck, N. Y	$351.00
W. J. Bannerman, Brooklyn, N. Y	337.00
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The bids of Messrs. M. H. Gregory and Oscar F. Smith were accepted for the purchase of the *Catalpa* and *Speedwell*, respectively.

The expense of advertising the tug *Mayflower* was $113.78, and for twice advertising the sale of the tugs *Catalpa* and *Speedwell* was $325.86. The net proceeds arising from the sale of the three vessels have been covered into the Treasury, in accordance with section 3618 of the Revised Statutes, as "Miscellaneous receipts on account of proceeds of public property."

MISCELLANEOUS RECEIPTS FOR GOVERNMENT PROPERTY.

In the appendix will be found a detailed statement, prepared in the office of the Auditor for the Navy Department, of deposits in the Treasury from November 1, 1893, to October 31, 1894, arising from the sale of condemned vessels, stores, and materials; from gains on exchange, interest, and rents; from purchase of discharges by enlisted men of the Navy and Marine Corps; from supplies furnished to and work performed for other branches of the Government, and from other lawful disposition of public property under the cognizance of the Navy Department.

The total amount so deposited was $34,618.57, of which sum $10,333.16 was covered into the Treasury as "Miscellaneous receipts on accounts of proceeds of public property," as required by section 3618 of the Revised Statutes, and the remainder, $24,285.41, carried, as authorized by law, to the credit of the proper appropriations, to be applied to naval purposes.

LABOR AT NAVY-YARDS.

The system of employing workmen at navy-yards through a board of labor, taking them without reference to politics and in the order of their application, giving preference to veterans and those with former

navy-yard experience, has been adhered to, and continues to be commended without exception by all naval officers and others whose duties have brought them in contact with it. It is believed that those taken on through these labor boards at the several yards are politically divided approximately in the proportion that parties bear to each other in the vicinity of such yards. No instance of favoritism in the employment of labor is believed to have occurred, and, indeed, no well-founded complaint on that score has at any time been made. In a few instances officers, through a misunderstanding of the rules, have given workmen employment irregularly, and in these cases corrective measures were promptly applied. The only complaint against the rules which has been made with any show of plausibility is to the effect that foremen recommending laborers to be dropped for want of work have been influenced by political considerations in selecting those whose services are of least value. A careful investigation of every such charge seriously made has not shown any of them to be well founded, but the Department, in order to prevent occasion for such complaints hereafter, has amended the rules so as to provide that the commissioned officers on duty as heads of department in navy-yards shall personally acquaint themselves with the quality of the work done by each employé, and themselves be held responsible for all discharges.

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For the *Catalpa:*	
M. H. Gregory, Great Neck, N. Y	$351.00
W. J. Bannerman, Brooklyn, N. Y	337.00
W. O. Day, New York City	200.00
For the *Speedwell:*	
Oscar F. Smith, Norfolk, Va	337.00
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MISCELLANEOUS RECEIPTS FOR GOVERNMENT PROPERTY.

In the appendix will be found a detailed statement, prepared in the office of the Auditor for the Navy Department, of deposits in the Treasury from November 1, 1893, to October 31, 1894, arising from the sale of condemned vessels, stores, and materials; from gains on exchange, interest, and rents; from purchase of discharges by enlisted men of the Navy and Marine Corps; from supplies furnished to and work performed for other branches of the Government, and from other lawful disposition of public property under the cognizance of the Navy Department.

The total amount so deposited was $34,618.57, of which sum $10,333.16 was covered into the Treasury as "Miscellaneous receipts on accounts of proceeds of public property," as required by section 3618 of the Revised Statutes, and the remainder, $24,285.41, carried, as authorized by law, to the credit of the proper appropriations, to be applied to naval purposes.

LABOR AT NAVY-YARDS.

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The regulations governing this system have been amended during the past year in such respects as experience has suggested. The most important of these amendments was made more than twelve months ago. This dropped from the register the names of all applicants after twelve months who had not been employed. Theretofore the names of applicants remained on the rolls indefinitely. The beneficial results of this amendment are shown in the fact that whereas 26.5 per cent of those who were certified and called on for work failed to respond during the year ending September 30, 1893, only 16.8 per cent of those so called during the year ending September 30, 1894, failed to respond.

It is hoped and believed that during the coming two years the system as at present carried out will result in such a fair and equitable distribution of employés at navy-yards that all political parties will agree that this method of employing labor, so heartily commended by all who understand its merits, should become permanent. The labor at navy-yards has so increased in efficiency that many of the superintending officers contend, and it would seem with much show of reason, that the Government can now fairly compete with private concerns in the cost of constructing vessels and machinery.

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During the past season I visited and personally inspected the navy-yards at Mare Island, Brooklyn, Boston, and Norfolk and the naval stations at New London, Newport, and Puget Sound. A careful examination of the actual needs of these places materially aided in the revision of the estimates for their maintenance and improvement which have been submitted by the Department.

There is and will always be found back of every naval station a strong local demand that it shall be built up into a navy-yard, just as there comes from those in and around a navy-yard that has been wholly or partially closed an appeal to rehabilitate and put it on a footing of perfect equality with other yards. Such demands are often entirely local and altogether independent of the public necessities, yet they frequently make themselves felt in Congress. Secretary Chandler took up this question during his administration of the Department and discussed it fully in more than one of his reports. He pointed out clearly the wastefulness resulting, first, from dividing similar work in a yard among many shops representing the different bureaus, and, secondly, from having many different navy-yards doing the work of repairs. We had at that time more navy-yards and stations in operation than there were in the home ports of either Great Britain or France, notwithstanding the fact that those nations had each many times our number of ships in commission.

Mr. Chandler closed some of the yards—a vigorous and decided step in the right direction. Secretary Whitney, shortly after he came in, entered upon the task of consolidating workshops. He gave all the ordnance work to the navy-yard at Washington, all equipment work to the Boston yard, and all construction and repair work to the yards at Brooklyn, Norfolk, and Mare Island. Secretary Tracy adhered to the general policy of his two predecessors in this regard, but there has been a continual struggle on the part of the friends of all the yards to get them open for general repair work, as well as a constant effort in Congress to build new navy-yards. What our Navy needs is more ships and guns, not more navy-yards.

The multiplication of plants and the scattering of work would be in defiance of all business principles. Such a policy would be not only extravagant and wasteful, but really ruinous to the Navy. The Navy itself can not be successfully defended and can not retain its place in popular esteem if the methods resorted to by its friends are in themselves indefensible. It would probably be true policy to have one navy-yard or repair station upon the Gulf of Mexico, for the convenience of our ships in Southern waters, but beyond this we have no need of additional navy-yards or navy-yard plants.

PUBLICATION OF NAVAL WAR RECORDS.

Under the authority of an act of Congress approved July 31, 1894, the Department has begun the publication of the Naval War Records. The first volume is in press and will soon be ready for issue, and the

second volume will be published before the end of the present fiscal year. The appropriation asked for in the estimates is intended to cover the cost of three additional volumes, which will be ready for publication during the fiscal year.

The report of Lieut. Commander Richard Rush, U. S. Navy, the Superintendent of Naval War Records, which is herewith appended, shows that much valuable material has been collected during the past year, and it is the desire of the Department to continue this important publication as rapidly as possible. The indications now are that these records will excite great interest and be much in demand. The exploits of the American Navy during the civil war were on a grander scale and more efficacious than at any other period in our history, and certainly the valor of officers and men never shone more conspicuously. The time is now at hand when the naval history of that period should be written. The matter already in hand and that being now collected will furnish material for its exhaustive study.

EXAMINATIONS FOR PROMOTION.

The present system of examinations for promotion in the Navy is not complete, inasmuch as its provisions are not applicable to all grades of officers in the naval service. The recommendation contained in my last annual report that Congress be asked to extend the provisions of existing law respecting the examination of officers as to their physical, mental, moral, and professional qualifications for promotion to all grades of all corps in the Navy, and that the whole system of examinations be placed on a similar footing to that of the Army and Marine Corps, is respectfully renewed.

LIMITATION OF PUNISHMENTS.

In my last report attention was invited to the subject of limitation of punishments, and the Committees on Naval Affairs of both Houses of Congress had under consideration bills providing that whenever by any of the articles for the government of the Navy the punishment on conviction of any offense is left to the discretion of the court-martial the punishment therefor shall not, in time of peace, be in excess of a limit which the President may prescribe; but these bills were not acted upon. Provisions similar to those referred to are in practical operation in the Army and have been found eminently satisfactory. Believing that their application to the Navy would tend to promote the *morale* of the service I recommend that Congress be asked to give the subject early and favorable consideration.

AUTHORIZING CERTAIN OFFICERS TO ADMINISTER OATHS.

A bill was introduced during the past session of Congress providing that judges-advocate of general courts-martial and courts of inquiry, and all commanders-in-chief of naval squadrons, commandants of navy

yards and stations, and officers commanding vessels of the Navy be authorized to administer oaths "for the purpose of naval justice and for other purposes of naval administration." The House passed the bill, but it was not reached in the Senate, and is still on the calendar of that body. I would suggest that the usefulness to the service of this measure would be enlarged if before its passage it be amended so as to embrace in its provisions the adjutant and inspector, commanding officers, and recruiting officers of the Marine Corps. Should the bill become a law, it will result in a very considerable annual saving to the Government.

PROPOSED STATUTES OF LIMITATION.

The Committees on Naval Affairs of the House and Senate had before them during the last session of Congress bills providing that no person shall be tried or punished for an offense committed more than two years prior to the issuing of the order for his trial, unless by reason of having absented himself, or of some other manifest impediment, he shall not have been amenable to justice within that period; and that in case of desertion, his absence shall be excluded in computing the limitation, which shall not begin until the end of the term for which he was enlisted in the service.

In view of the importance to the naval service of the legislation contained in the bills referred to, it is recommended that the attention of Congress be again invited to the matter.

CIVILIAN WITNESSES.

The unwillingness of civilians to appear before naval courts as witnesses in cases of gross negligence in payment of debts, scandalous conduct, fraudulent acts, etc., and the inability of naval courts to compel such witnesses to appear and testify, render it occasionally impracticable to bring to trial persons whose conduct causes discredit to the service. It not infrequently happens that the evidence upon which conviction can be secured in cases of serious offenses against naval discipline rests wholly within the knowledge of civilians. On the other hand, it is equally true that one in the Navy might be convicted unjustly of an offense in consequence of being unable to compel the attendance of civilian witnesses whose testimony was necessary to his defense.

These considerations lead me to the conclusion that the interests of the naval service and the ends of justice would be promoted by conferring upon naval courts the power to compel the attendance and to require the testimony of civilian witnesses whose evidence may be essential to the administration of justice in cases pending before such courts.

DEPOSITIONS.

Bills were introduced in both Houses of Congress during the recent session providing that depositions may, in certain cases, be used as evidence before naval courts-martial, but such bills did not become law.

For the reasons given in my last annual report I am of opinion that the provisions of law on this subject now applicable to military courts-martial should be extended also to naval courts, with such modifications as may be necessary to adapt them to the naval service.

It frequently happens that a period of several months must elapse after an offense has been committed before it is found practicable to convene a court for the trial of the person charged with such offense. During that time the exigencies of the service may have rendered it necessary to order to some distant station one or more persons having knowledge of material facts bearing upon the guilt or innocence of the accused. In such cases it is often a serious question whether the expense, loss of time, and interruption of public business, incident to the recalling of a witness whose testimony is desired, shall be incurred on the one hand, or whether, on the other, it is right and proper to proceed with the trial of a person charged with an offense against naval discipline in the absence of a witness having knowledge of facts material to the determination of his guilt or innocence.

It is apparent that the taking of depositions under suitable restrictions would, in a majority of cases of this character, prove to be a satisfactory and just solution of the difficulty, and one which, if adopted, would undoubtedly save to the Government annually very considerable sums now expended in the transportation of officers and men whose testimony before naval courts is deemed essential, and it would at the same time avoid much loss of time and interruption of public business. It is not, of course, intended or suggested that depositions shall be universally or even generally substituted for oral testimony before naval courts. Commissions to take such evidence should issue only in the cases of persons serving upon, or ordered to distant stations, and not then, unless it shall appear that the facts within the knowledge of such persons are of a nature to be clearly established by depositions.

LIVE-OAK TIMBER RESERVATIONS.

In the early part of the present century a number of tracts of land in the States of Florida, Alabama, and Mississippi were reserved from the public domain for naval purposes as a source of supply for live-oak timber. At that time the probable future needs of the Government appeared to warrant the segregation from the public domain of these extensive tracts, particularly in view of the fact that live oak was then the chief material used for the heavy timbers of naval vessels. In consequence, however, of the general disuse of wood in naval construction, such timber is now no longer required in any quantity for naval uses, and the Department has for many years past given no attention to said lands.

There are on hand now in the navy-yards at Norfolk, Brooklyn, and elsewhere many thousands of feet of seasoned live oak, for which the Department has been unable to find either use or sale. The Navy

Department has not, therefore, seen proper to extend any especial supervision over these reservations, especially as the Department of Justice is charged with the general duty of preventing trespasses upon the property of the United States. This duty is, no doubt, being faithfully performed, but so far as the Navy is concerned no reason is perceived why the Department of Justice should be longer burdened with the task. Having stated this much, it may not be out of place to say that, in my opinion, such reservations obstruct the settlement and development of the sections in which they are located, and offer a continuing temptation to trespassers and squatters.

The Secretary of the Interior, in answer to a recent inquiry from this Department on the subject, stated that in his opinion ample provision for the restoration to the public domain of such of these lands as lie within the State of Florida is contained in the "act to authorize the Secretary of the Navy to transfer to the Secretary of the Interior all lands in the State of Florida not needed for naval purposes," approved March 3, 1879 (Stat. L., vol. 20, p. 470). This Department is now taking the necessary steps to transfer to the Secretary of the Interior such of these lands as are no longer needed for naval purposes, in order that they may be restored "to entry and sale in the same manner and under the same conditions as other public lands of the United States" in pursuance of section 2 of the act cited.

The provisions of the act of March 3, 1879, apply, however, only to lands lying within the State of Florida. Inasmuch as the conditions which have prompted the action above referred to in the case of lands in the State of Florida apply with equal force to naval reservations of like character in the States of Alabama and Mississippi, it is respectfully recommended that Congress be asked to extend the provisions of that act to the States last named.

DETAIL OF RETIRED OFFICERS OF THE NAVY TO DUTY AT COLLEGES.

The detail of officers of the Navy on the active list and of officers of the Army, either active or retired, to duty as instructors at colleges, under certain conditions, is authorized by existing law. It frequently occurs that, by reason of the exigencies of the service, officers on the active list can not be spared from their regular duties and assigned to colleges when asked for. The Department fully recognizes the advantages resulting from details of this character, and it is recommended that Congress be asked to authorize the detail to this duty of officers of the Navy on the retired list who may make application for such assignment. Authority to detail officers on the retired list of the Army to duty at colleges has been conferred by Congress upon the Secretary of War, and it seems that a like provision respecting retired naval officers would be just and proper, and would result beneficially to the educational work of the colleges concerned and to the naval service.

It is further recommended that Congress be asked to amend the act authorizing the Secretary of War to loan ordnance and ordnance stores

to certain colleges and schools, so as to accord to such institutions the same privileges when a retired naval officer is employed as that act confers when retired Army officers are assigned to such institutions.

PROPOSED TRANSFER OF THE COAST SURVEY.

The Naval Committee of the House of Representatives has now under consideration the subject of the transfer of the work of the Coast and Geodetic Survey, a part to the Hydrographic Office of the Navy Department and the remainder to the Geological Survey under the Interior Department. After a careful personal investigation of this subject, begun years ago, I am convinced that the Coast Survey work proper now remaining to be done along our coasts can be carried on quite as efficiently and much more economically by the Navy Department than under the Coast and Geodetic Survey.

The work of the Coast Survey, for which that organization is peculiarly fitted, is the topography of the shore lines and immediate adjacent lands. This work has been done with great care and accuracy, but it is practically all completed. Only very small patches of the topographic work along the lines of the Gulf of Mexico and the shores of California remain undone. That this work has long been considered by the Coast Survey officials to be of little immediate value is apparent from the fact that it has been left undone for many years. It is believed that if a very small proportion of the annual expenditures of the Survey for the past ten years, say one-tenth, had been devoted to the purpose, this unfinished topography would all have been completed years ago. Should the work of the Coast Survey be transferred to the Navy, it is safe to say that all the topographic work along our shores, excluding Alaska, would be completed promptly, as the Navy is deeply interested in having complete charts of our coasts.

The topography of the coast lines once completed is enduring. Changes caused by advancing or receding shore lines are relatively few, unimportant, and especially easy to be noted. The work that is less enduring, though it is all important and must therefore be done over and over again, is the hydrographic work, the soundings by which the changes made in the bottom of the sea by the shifting sands and drifting sediment shall always be made known to the sailor. This hydrographic work, which is to constitute in future the greatest portion of the outdoor labor of the Survey, is now and has for years been done by and under the superintendence of officers of the Navy detailed to work under the Coast Survey. Why the Survey should remain a separate and independent bureau when its principal task has been accomplished is not easy to see. The Coast Survey continues, of course, to make and correct maps and charts, from data furnished it, but work exactly similar is being done, and well done, in the Hydrographic Office of the Navy Department. A transfer of all this work to

this Department would unify, cheapen, and expedite the making and correcting of the charts which must always remain essential to navigation and commerce.

In recommending this transfer I am fully in accord with the Secretary of the Treasury, as is evidenced by the following extract from a communication from him to the chairman of the House Naval Committee in regard to this matter:

> That the work performed by the Survey, or at least the greater part of it, is of great value to the Government is not questioned; but I am unable to see the necessity for the maintenance of a separate and distinct bureau to carry it on when it can be done as efficiently and more economically by the Hydrographic Office in the Department of the Navy and the Geological Survey in the Department of the Interior.

The portion of the work of the Coast Survey referred to in this extract as proper to be transferred to the Geological Survey is its geodetic work proper. This lies almost entirely in the interior, and has therefore no connection whatever with the survey of the coast.

ESTIMATES AND APPROPRIATIONS.

Comparative exhibit of estimates and appropriations, 1895 and 1896.

Detailed objects of expenditure and appropriation.	Estimates, 1895.	Appropriations 1895, current year.	Estimates, 1896.
General establishment:			
Pay of the Navy	$7,475,000.00	$7,480,500.00	$7,472,848.00
Pay miscellaneous	240,000.00	240,000.00	240,000.00
Contingent Navy	7,000.00	7,000.00	7,000.00
Bureau of Yards and Docks:			
Ordinary expenses	703,809.54	706,959.54	805,912.37
Public works	403,831.00	552,323.05	1,044,803.00
Bureau of Navigation:			
Ordinary expenses	276,750.00	139,000.00	367,250.00
Naval Academy	197,101.45	215,101.45	200,101.45
Bureau of Equipment	1,131,025.00	1,121,025.00	1,309,025.00
Bureau of Ordnance	645,801.00	378,801.00	1,626,882.50
Bureau of Construction	919,972.50	1,077,972.50	1,019,972.50
Bureau of Steam Engineering	1,017,900.00	917,900.00	1,162,900.00
Bureau of Supplies and Accounts	1,287,532.03	1,287,532.03	1,287,532.03
Bureau of Medicine and Surgery	125,000.00	125,000.00	126,800.00
Marine Corps:			
Pay department	702,000.00	700,820.65	700,820.65
Quartermaster's department	264,210.00	267,210.50	288,780.90
Naval Observatory	23,956.00	23,956.00	92,000.00
Hydrographic Office	10,000.00	14,000.00	.....
Total running expenses	15,430,889.02	15,255,101.72	17,692,628.40
Increase, Navy:			
Bureau of Equipment	.....	.....	142,500.00
Bureau of Ordnance	6,500,000.00	4,117,000.00	5,237,670.00
Construction and Machinery	5,955,025.00	5,994,725.00	7,879,222.00
Total increase, Navy	12,455,025.00	10,111,725.00	13,259,392.00
Grand total	27,885,914.02	25,366,826.72	30,952,020.40

The total amount given in the foregoing statement as the appropriation for the current fiscal year does not include the appropriation of $45,000 for the purpose of reclaiming the wreck of the U. S. S. *Kearsarge*, made by act of Congress approved March 9, 1894, nor the sum of $45,000 to continue the construction of the dry dock at Puget Sound, appropriated in the sundry civil act approved August 18, 1894. Including these items, the total appropriations for the naval service at the last session of Congress amount to $25,456,826.72. Of the sum of $45,000 for the reclaiming of the wreck of the *Kearsarge* only $8,500 has been used.

From the above it will be seen that the estimates for the coming fiscal year exceed the total appropriations for the naval service made by the last session of Congress by $5,495,193.68. In the preparation of these estimates every effort has been made to reduce each item to the lowest possible point, and I am convinced that no smaller amount than herein designated will suffice for the actual necessary expenditures of this Department.

This excess over the total appropriations for the present fiscal year is principally due to the necessity for a materially greater sum for "Increase Navy," necessitated by the fact that, with possibly one exception, all of the new vessels heretofore authorized will be completed and the final payments on them will become due during the coming fiscal year. The sum carried in the present estimates for "Increase Navy," namely, $13,259,392, will thus all be needed during the coming fiscal year, after which, unless new vessels are appropriated for in the meantime, the only additional sum required will be that necessary to make the final payments for the first-class battle ship Iowa, which it is believed will not exceed $750,000.

Appropriations, expenditures, and balances, fiscal year ending June 30, 1894, and balances undrawn October 31, 1894.

	Appropriations for fiscal year ending June 30, 1894, exclusive of public works.	Amount drawn in fiscal year ending June 30, 1894.	Balances June 30, 1894.	Balances undrawn Oct. 31, 1894.
Pay of the Navy	$7,300,000.00	$5,872,582.26	$1,427,417.74	$549,440.77
Pay, miscellaneous	240,000.00	229,774.13	10,225.87	9,069.14
Contingent, Navy	7,000.00	4,958.05	2,041.95	1,714.21
Yards and docks:				
Maintenance	230,000.00	211,499.47	18,500.53	1,971.32
Repairs and preservation navy-yards	275,000.00	261,987.26	13,012.74	4,619.52
Civil establishment	61,494.54	60,880.50	614.04	1,002.72
Contingent	15,000.00	7,458.13	7,541.87	6,175.27
Naval Home, Philadelphia, Pa	69,215.00	58,730.09	10,484.91	1,889.76
Equipment:				
Equipment of vessels	925,000.00	842,238.50	82,761.50	12,781.50
Civil establishment	19,025.00	18,960.64	64.36	157.00
Contingent	12,000.00	10,045.59	1,954.41	9.13

Appropriations, expenditures, and balances, fiscal year ending June 30, 1894, etc.—Cont'd.

	Appropriations for fiscal year ending June 30, 1894, exclusive of public works.	Amount drawn in fiscal year ending June 30, 1894.	Balances June 30, 1894.	Balances undrawn Oct. 31, 1894.
Navigation:				
Pay, Naval Academy	$104,265.45	$104,150.00	$115.45	$321.30
Repairs, Naval Academy	21,000.00	16,500.53	4,499.47	2,272.24
Heating and lighting Naval Academy	17,000.00	16,899.06	100.94	3.69
Special course, Naval Academy	3,000.00	1,806.01	1,193.99	1,147.74
Contingent, Naval Academy	41,800.00	32,970.70	8,829.30	2,993.54
Naval War College and Torpedo School	8,000.00	6,160.47	1,839.53	268.85
Naval training station	44,000.00	43,568.38	431.62	68.96
Gunnery exercises	6,000.00	4,754.41	1,245.59	.....
Transportation, recruiting, and contingent	45,000.00	32,861.32	12,138.68	6,874.28
Ordnance:				
Ordnance and ordnance stores	200,000.00	128,398.86	71,601.14	50,754.45
Repairs	30,000.00	21,882.04	8,117.96	4,796.11
Civil establishment	26,824.00	26,542.50	281.50	1,057.53
Contingent	8,000.00	6,224.68	1,775.32	.21
Torpedo station	60,000.00	56,629.73	3,370.27	1,563.73
Construction and Repair:				
Construction and repair	950,000.00	864,524.12	85,475.88	21,744.19
Civil establishment	19,972.50	18,919.56	1,052.94	1,105.10
Steam Engineering:				
Steam machinery	695,000.00	625,167.75	69,832.25	13,508.16
Civil establishment	11,900.00	11,766.26	133.74	133.77
Contingent	1,000.00	875.78	124.22	101.26
Supplies and Accounts:				
Provisions, Navy	1,090,000.00	1,033,470.63	56,529.37	28,932.62
Civil establishment	67,532.03	65,862.89	1,669.14	1,827.56
Contingent	40,000.00	37,214.45	2,785.55	.48
Medicine and Surgery:				
Medical department	60,000.00	53,639.22	6,360.78	348.78
Repairs	20,000.00	15,555.37	4,444.63	769.50
Contingent	25,000.00	22,095.13	2,904.87	2.70
Marine Corps:				
Pay	696,478.36	602,808.25	93,670.11	63,188.44
Clothing	75,000.00	71,792.72	3,207.28	2,667.88
Provisions	80,000.00	77,674.58	2,325.42	102.62
Fuel	19,500.00	12,715.45	6,784.55	4,042.04
Repairs of barracks	12,000.00	11,842.74	157.26	150.36
Military stores	13,286.50	11,601.55	1,684.95	1,295.48
Transportation and recruiting	15,000.00	10,594.78	4,405.22	3,514.31
Forage	2,800.00	2,301.50	498.50	2.29
Hire of quarters	6,624.00	6,111.29	512.71	354.31
Contingent	30,000.00	30,000.00	.....	46.01
Total	13,699,717.38	11,664,997.33	2,034,720.05	804,730.86

As will be seen from the foregoing exhibit—		
The appropriations for current expenses for the fiscal year ending June 30, 1894, exclusive of public works, amounted to		$13,699,717.38
Drawn by requisition to June 30, 1894		11,664,997.33
Balance undrawn July 1, 1894		2,034,720.05
Add appropriations for the fiscal year 1894, made by the deficiency act, approved August 23, 1894, as follows:		
Provisions, Navy	$50,000.00	
Clothing, Marine Corps	10,000.00	
Contingent, Marine Corps	278.04	
		60,278.04
Available for use after July 1, 1894		2,094,998.09
Drawn by requisition from July 1 to October 31, 1894		1,290,267.23
Balance undrawn November 1, 1894		804,730.86
Add balances in the hands of disbursing officers at same date		2,143.68
Making the available balance		806,874.54

INCREASE OF THE NAVY.

The estimates for this year for "Increase Navy" will be the last of the large annual amounts required for the building up of the new Navy, so far as the same has been authorized. It may therefore be stated that this is substantially the last payment on account of the vessels provided for by law. Unless, then, new constructions are authorized expenditures under this head will fall with great rapidity after the next fiscal year and thereafter entirely disappear from the annual appropriations. It is estimated that with the expenditure of not more than $750,000 for the fiscal year ending June 30, 1897, the existing new Navy will have been entirely paid for. Thus it will be seen that the expenditures under "Increase Navy" will decrease at one bound from the amount asked for this year, $13,259,392, to $750,000, as above stated. The condition of the work now in progress is such that the present estimates are for an indebtedness which will be due before the end of the next fiscal year.

Without considering the effect of the cessation of this work on industrial conditions, and disclaiming all obligation of the Government to engage in public works for the purpose of giving employment to any class, however deserving, I respectfully urge that from the standpoint of national defense it will be unwise to stop entirely the work of naval upbuilding; that wisdom and experience demand that the present well organized, highly trained, and exceedingly efficient body of mechanics and skilled laborers engaged in the work of naval shipbuilding shall not, at least, be entirely disbanded. With the stoppage of this work many large plants now at work for the Navy will have to shut down either completely or in part, and their corps of skilled workmen employed in the various phases of naval construction and development be discharged and scattered, while the plant and machinery for the production of vessels of war must of necessity become idle and be allowed to deteriorate.

As to the need of more vessels and the classes of ships desired, I beg to repeat what was said in my last annual report:

The cruisers and gunboats we have, built and building, constitute an efficient fleet, and will prove sufficient, when they shall all be in commission, for cruising purposes in ordinary times, and to look after our commerce abroad. In time of war these cruisers, aided by the *Paris*, the *New York*, and the other ships being built by Wm. Cramp & Sons for the American line, which constitute practically all of our auxiliary navy that is valuable, would be of great use as commerce destroyers.

But unarmored cruisers are not, properly speaking, fighting vessels. They can destroy merchant ships, they can fight vessels of their own class, but they can not meet armored vessels with any reasonable hope of success, and in time of war, scattered abroad over the high seas as they would be if we sent them against an enemy's commerce, they would leave our unfortified seacoast, with all its cities, absolutely without reliance, except upon our 4 first-class and 2 second-class battle ships, 7 coast-defense vessels, and 2 little torpedo boats. These, if they were all concentrated, would scarcely be able to create a diversion of an enemy's fleet, and if scattered would not furnish a battle ship or even a torpedo boat for the defense of each coast city. If we carried out such a programme during a war an enemy with a fleet of battle ships could wreck cities while we are robbing schooners.

The military value of a commerce-destroying fleet is easily overrated. Cruisers directed against an enemy's wealth afloat are capable of doing great damage. They create consternation among merchants and worry the people against whose property they are directed, but unsupported by ships of the line their operations are perhaps never decisive of a war. During the twenty years from 1792 to 1812, the period covered by the French Revolution, French cruisers and privateers captured many thousands of British vessels and cargoes, but these captures operated more to provoke a spirit of determined hostility among the British people than to create such distress or alarm as would put an end to hostilities. English line-of-battle ships, instead of scattering to convoy merchant vessels, hunted and destroyed the French vessels of war at the battle of the Nile, at Cape St. Vincent, and at Trafalgar. In the meantime, in spite of her losses of merchant ships and their cargoes, England continued to grow rich by her commerce. With her mighty battle ships she cut off Napoleon's communications by water. With her wealth she subsidized his enemies, and it is undoubtedly true that the two great factors in the downfall of the great conqueror were the numerous battle ships of England, with their hardy crews of Anglo-Saxons, and the enormous wealth of the greatest sea power of the world.

The history of our civil war furnishes a more recent and familiar proof of my statement. The cruises of the *Alabama* and her sister ships were uncommonly successful. Semmes rivaled the exploits of Jean Bart and Du Guay-Trouin. History will rank him as one of the most famous rovers of the seas. His success delighted the Confederates, but it did not benefit their cause. Many, indeed, were the complaints made against President Lincoln because he sent so few ships to search for the Confederate cruisers, but he was too wise to listen to the clamor. The fleets of the United States were not to be thus diverted from their purpose. They blockaded the ports of the Confederacy, they penetrated its rivers, cut off its interior communications, and thus it was that the Navy rendered services to the cause of the Union which the public has never yet fully appreciated. In the meantime, in spite of depredations, American commerce flourished. Merchants insured against war risks, and individual losses were borne by communities. Commerce destroying was irritating, but it decided nothing. It would not have been effectual even if the Confederates had possessed ten times as many cruisers, unsupported as they were by line-of-battle ships.

If our Government in the future is to have naval strength enough to command the peace and be in condition to "enforce the terms dictated by its sense of right and justice" it must have more battle ships, and must build a reasonable number of torpedo boats.

For the defense of ports torpedo boats are perhaps more effective according to cost than any other class of vessels. The knowledge of their existence alone will make an enemy chary about approaching within bombarding distance. The value of this boat is recognized by all naval powers, and they are being built abroad in great numbers. Their usefulness was emphasized last summer during the English manœuvers under war conditions where service torpedoes with collapsible heads were used. In these manœuvers one of the contending squadrons was without these boats, but was furnished with battle ships and a number of fast cruisers and gun vessels; the other had 24 torpedo boats stationed at 6 of the ports to be defended.

During the progress of the manœuvers (seven days) frequent attacks were made by these boats in groups, and the official decisions of the umpires recognized that they had destroyed 1 battle ship and 6 cruisers. The vessels decided to have been destroyed were actually struck by torpedoes with dummy heads, and no other claims were allowed. During this period 18 torpedo boats were deemed to have been destroyed by the enemy. A rough calculation of the difference in expenditure will give the value of the battle ship, which carried 400 men, as $3,750,000, and of the 6 cruisers, which carried 1,650 men, as $6,000,000, an aggregate of 2,050 men, and a total value of $9,750,000, while the value of 18 torpedo boats was about $1,800,000, and their crews aggregated 350 men, the difference in losses being, in money, $7,950,000, and in men, 1,690. Torpedo boats, however, can not be relied upon alone. They must be accompanied by battle ships, as the enemy will be certain to come with battle ships and torpedo boats also.

As to the value of torpedo boats, the consensus of naval-expert opinion is very conclusively shown by a table presented elsewhere, from which it appears that the number of torpedo boats built and building throughout the world is almost exactly equivalent to the number of all other naval vessels, every class included.

I beg to recommend that Congress be asked to authorize the construction of 3 battle ships of about 10,000 tons displacement each, to cost, exclusive of armament, not exceeding $4,000,000 each, and 12 torpedo boats of from 100 to 300 tons each, at the discretion of the Secretary of the Navy, to cost not exceeding an average of $170,000.

HILARY A. HERBERT,
Secretary.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Navy Department.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES, OFFICE OF SECRETARY OF THE NAVY.			
Secretary (act July 31, 1894)	$8,000		
Assistant Secretary (same act)	4,500		
Chief clerk (same act)	2,500		
Clerk to Secretary (same act)	2,250		
Disbursing clerk (same act)	2,250		
One clerk of class 4 in charge of files and records (same act)	1,800		
One clerk of class 4 (same act)	1,800		
Three clerks of class 3 (same act)	4,800		
One stenographer (same act)	1,600		
One stenographer (same act)	1,400		
One clerk of class 2 (same act)	1,400		
Four clerks of class 1 (same act)	4,800		
One clerk (same act)	1,000		
One telegraph operator (same act)	1,000		
One carpenter (same act)	900		
Two messengers, at $840 each (same act)	1,680		
Three assistant messengers, at $720 each (same act)	2,160		
Two messenger boys, at $420 each (same act)	840		
One messenger boy (same act)	360		
One laborer (same act)	660		
One clerk of class 1 for Inspection Board (same act)	1,200		
One laborer (same act)	660		
One clerk of class 1 for Examining and Retiring Board (same act)	1,200		
		$48,760	$48,760
CONTINGENT EXPENSES, NAVY DEPARTMENT.			
For stationery, furniture, newspapers, plans, drawings, drawing materials, horses and wagons to be used only for official purposes, freight, expressage, postage, and other absolutely necessary expenses of the Navy Department and its various bureaus and offices (act July 31, 1894)		11,000	11,000
PRINTING AND BINDING.			
Printing and binding for the Navy Department, including $12,000 for the hydrographic office, to be executed under the direction of the Public Printer		70,000	70,000
SALARIES, OFFICE OF JUDGE-ADVOCATE-GENERAL.			
Chief clerk (in lieu of one clerk of class 4). (R. S., p. 27, sec. 167; June 8, 1881, vol. 21, p. 164, sec. 1; July 31, 1894.)	1,800		
One clerk of class 4 (same acts)	1,800		
One clerk of class 3 (same acts)	1,600		
Three clerks of class 1 (same acts)	3,600		
One clerk (same acts)	1,000		
One laborer (same acts)	660		
		10,460	10,460
NOTE.—One of the clerks of class 4 now provided for has been actually performing the duties of chief clerk for some time past. His designation as such will promote the efficient organization of the office without involving any increase in his compensation or any change whatever in the amounts appropriated.			

Estimate of appropriations required for the service of the fiscal year ending June 30, 1896, by the Navy Department—Continued.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
LIBRARY OF THE NAVY DEPARTMENT.			
Salaries:			
One clerk, at $1,000 (act July 31, 1894)	$1,000		
One assistant messenger, at $720 (same act)	720		
One laborer, at $660 (same act)	660		
		$2,380	$2,380
For professional books and periodicals for the library (same act)	1,000	1,000	500
OFFICE OF NAVAL RECORDS OF THE REBELLION.			
Salaries:			
Two clerks of class 4 (act July 31, 1894)	3,600		
One clerk of class 3 (same act)	1,600		
One clerk of class 2 (same act)	1,400		
One clerk of class 1 (same act)	1,200		
One clerk of class 1 in lieu of one clerk of class 2, now authorized (submitted)	1,200		
Two clerks, at $1,000 each (act July 31, 1894)	2,000		
Two copyists, at $900 each (same act)	1,800		
Four copyists, at $720 each (same act)	2,880		
		15,680	15,880
Necessary traveling and incidental expenses for collection of records (same act)	600	600	600
Publication of the Official Naval Records of the Rebellion, for continuing the publication of the Official Naval Records of the Rebellion, both Union and Confederate, in accordance with the plan adopted by the Secretary of the Navy under the act of Congress approved July 31, 1894 (act July 31, 1894)	25,000	25,000	15,000
PAY OF THE NAVY.			
Pay of officers on sea duty; officers on shore and other duty; officers on waiting orders; officers on the retired list; clerks to commandants of yards and stations; clerks to paymasters at yards and stations; general storekeepers; receiving ships and other vessels; extra pay to men reenlisting under honorable discharge; interest on deposits by men; pay of petty officers, seamen, landsmen and boys, including men in engineers' force, and for the Coast Survey Service and Fish Commission, 8,250 men and 750 boys, at the pay prescribed by law. (R. S., p. 246, sec. 1367; p. 248, sec. 1386–8; p. 265, sec. 1556; p. 269, sec. 1569; p. 269, sec. 1573; p. 272, sec. 1595; acts May 12, 1879, vol. 21, p. 3, sec. 1; Aug. 5, 1882, vol. 22, p. 285–7, sec. 1; Mar. 3, 1883, vol. 22, p. 472–3, sec. 1; Mar. 3, 1885, vol. 23, p. 340, sec. 1; Mar. 2, 1889, vol. 25, p. 809, sec. 1; July 19, 1892, vol. 27, p. 236, sec. 1; Mar. 3, 1893, vol. 27, p. 715, sec. 1; July 26, 1894)	7,472,848	7,472,848	7,475,000
NOTE.—The foregoing estimate is made up as follows:			
Pay of 1,494 officers on the active list	$3,404,950		
Pay of 300 naval cadets under instruction	150,000		
Pay of 408 officers on the retired list	902,814		
Pay of 97 clerks	125,000		
Pay of 9,000 petty officers, seamen, and other enlisted men, including apprentices in cruising vessels, training ship, and at the training stations	2,738,895		
Extra pay of petty officers and seamen reenlisting under honorable discharge	141,189		
To pay interest on deposits by men (act Feb. 9, 1889)	10,000		
Total	7,472,848		
PAY, MISCELLANEOUS.			
For commissions and interest; transportation of funds; exchange; mileage to officers while traveling under orders in the United States, and for actual personal expenses of officers while traveling abroad under orders, and for traveling expenses of apothecaries, yeomen, and civilian employés, and for actual and necessary travel-			

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Navy Department—Continued.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
PAY, MISCELLANEOUS—continued.			
ing expenses of naval cadets while proceeding from their homes to the Naval Academy for examination and appointment as cadets; for rent and furniture of buildings and offices not in navy-yards; expenses of court-martial, prisoners and prisons, and courts of inquiry, boards of investigation, examining boards, with clerks' and witnesses' fees, and traveling expenses and costs; stationery and recording; expenses of purchasing, paymasters' offices of the various cities, including clerks, furniture, fuel, stationery, and incidental expenses; newspapers and advertising; foreign postage; telegraphing, foreign and domestic; telephones; copying; care of library, including purchase of books, photographs, prints, manuscripts, and periodicals; ferriage; tolls, and express fees; costs of suits; commissions, warrants, diplomas, and discharges; relief of vessels in distress; canal tolls and pilotage; recovery of valuables from shipwrecks; quarantine expenses; reports; professional investigation; cost of special instruction, at home or abroad, in maintenance of students and attaches and information from abroad, and the collection and classification thereof, and other necessary incidental expenses (act July 26, 1894)	$240,000	$240,000	$240,000
CONTINGENT.			
For all emergencies and extraordinary expenses arising at home or abroad, but impossible to be anticipated or classified, exclusive of personal services in the Navy Department, or any of its subordinate bureaus or offices, at Washington, D. C	7,000	7,000	7,000

RETIRED LIST.

Estimate of the amount required to pay retired officers of the United States Navy for the year ending June 30, 1896.

Grade.	Number.	Pay per annum.	Amount.
Rear-admirals	2	$6,000	$12,000
Do	30	4,500	135,000
Commodores	8	3,750	30,000
Do	1	2,625	2,625
Captains	6	3,375	20,250
Do	4	2,625	10,500
Do	1	2,250	2,250
Do	1	1,950	1,950
Commanders	8	2,625	21,000
Do	1	2,100	2,100
Do	2	1,400	2,800
Do	1	1,150	1,150
Lieutenant commanders	7	2,250	15,750
Do	9	2,100	18,900
Do	1	1,950	1,950
Do	1	1,500	1,500
Do	1	1,350	1,350
Do	2	1,100	2,200
Do	1	700	700
Lieutenants	24	1,950	46,800
Do	8	1,800	14,400
Do	2	1,200	2,400
Do	5	900	4,500
Lieutenants, junior grade	7	1,500	10,500
Do	1	1,350	1,350
Do	1	900	900
Do	1	700	700

Estimate of the amount required to pay retired officers of the United States Navy for the year ending June 30, 1896—Continued.

Grade.	Number.	Pay per annum.	Amount.
Ensigns	9	$1,050	$9,450
Do	2	900	1,800
Do	2	600	1,200
Do	1	500	500
Do	1	300	300
Medical directors	3	3,750	11,250
Do	11	3,300	36,300
Do	1	3,150	3,150
Medical inspectors	8	3,300	26,400
Surgeons	5	2,625	13,125
Do	9	2,400	21,600
Do	1	2,100	2,100
Passed assistant surgeons	7	1,650	11,550
Do	1	1,100	1,100
Assistant surgeons	3	1,425	4,275
Do	2	1,275	2,550
Do	1	850	850
Pay directors	7	3,300	23,100
Pay inspectors	5	3,300	16,500
Do	1	1,500	1,500
Paymasters	4	3,150	12,600
Do	2	2,400	4,800
Do	1	1,400	1,400
Passed assistant paymasters	1	1,500	1,500
Assistant paymasters	1	1,425	1,425
Do	1	600	600
Chief engineers	1	3,750	3,750
Do	18	3,300	59,400
Do	2	3,150	6,300
Do	10	2,625	26,250
Do	1	2,400	2,400
Passed assistant engineers	4	2,025	8,100
Do	3	1,838	5,514
Do	20	1,650	33,000
Do	2	1,500	3,000
Do	3	1,275	3,825
Do	2	1,100	2,200
Do	1	850	850
Do	1	400	400
Assistant engineers	22	1,425	31,350
Do	4	1,275	5,100
Do	1	950	950
Do	2	850	1,700
Do	1	600	600
Do	1	500	500
Chaplains	6	2,100	12,600
Professors of mathematics	4	2,625	10,500
Naval constructors	1	3,375	3,375
Do	4	3,150	12,600
Civil engineers	1	3,250	3,250
Boatswains	14	1,350	18,900
Do	1	600	600
Gunners	24	1,350	32,400
Carpenters	14	1,350	18,900
Sailmakers	13	1,350	17,550
Do	1	500	500
Total	408	.....	902,814

Number of clerks, and their pay, allowed to commandants of yards and stations, to paymasters of yards, to general storekeepers, and on receiving ships and cruising vessels.

Number and designation.	Where employed.	Pay per annum.
One first clerk to commandant	Navy-yard, Portsmouth, N. H	$1,500
One second clerk to commandant	do	1,200
One clerk to paymaster of yard	do	1,400
One principal clerk to general storekeeper	do	1 300
One first clerk to commandant	Navy-yard, Boston, Mass	1,500
One clerk to paymaster of yard	do	1,600
One principal clerk to general storekeeper	do	1,600
One clerk to paymaster of receiving ship	do	1,600
One first clerk to commandant	Navy-yard, New York, N. Y	1,500
One second clerk to commandant	do	1,200
One clerk to paymaster of yard	do	1,600
One principal clerk to general storekeeper	do	1,600
One clerk to paymaster of receiving ship	do	1,600
One first clerk to commandant	Navy-yard, League Island, Philadelphia, Pa.	1,500
One second clerk to commandant	do	1,200
One clerk to paymaster of yard	do	1,600
One principal clerk to general storekeeper	do	1,600
One clerk to paymaster of receiving ship	do	1,600
One first clerk to commandant	Navy-yard, Norfolk, Va	1,500
One second clerk to commandant	do	1,200
One clerk to paymaster of yard	do	1,400
One principal clerk to general storekeeper	do	1,300
One clerk to paymaster of receiving ship	do	1,300
One first clerk to commandant	Navy-yard, Washington, D. C	1,500
Two second clerks to commandants, at $1,200 each	do	2,400
One clerk to paymaster of yard	do	1,600
One principal clerk to general storekeeper	do	1,600
One clerk to paymaster of receiving ship	do	1,300
One second clerk to commandant	Navy-yard, Pensacola, Fla	1,200
One clerk to paymaster of yard	do	1,400
One first clerk to commandant	Navy-yard, Mare Island, Cal	1,800
One second clerk to commandant	do	1,200
One clerk to paymaster of yard	do	1,800
One principal clerk to general storekeeper	do	1,300
One clerk to paymaster of receiving ship	do	1,800
One clerk to commandant	Naval station, New London, Conn	1,500
One clerk to paymaster of station	do	1,300
One clerk to commandant	Naval station, Newport, R. I	1,500
Do	Training station, Newport, R. I	1,500
One clerk to paymaster of receiving ship	do	1,300
One clerk to general storekeeper	do	1,300
One clerk to paymaster of station	Torpedo station, Newport, R. I	1,300
One clerk to superintendent	War College, Newport, R. I	1,500
One clerk to commandant	Naval station, Key West, Fla	1,500
One clerk to paymaster of station	do	1,300
One clerk to commandant	Naval Academy, Annapolis, Md	1,500
One clerk to cadets' storekeeper	do	1,300
One clerk to general storekeeper	do	1,300
One clerk to commissary	do	1,300
One clerk to paymaster of Academy	do	1,300
One clerk to paymaster of ships	do	1,300
One clerk to commanding officer	Naval Asylum, Philadelphia, Pa	1,500
One clerk to paymaster	do	1,300
One clerk to general inspector, pay corps	do	1,300
One clerk to commandant	Naval station, Puget Sound, Washington.	1,500
Do	Naval station, Port Royal, S. C	1,500
One clerk to paymaster	do	1,300
Do	Naval proving ground	1,300
Eight clerks to paymasters of flagships, at $1,100 each.		8,800
Three clerks to paymasters of first-rate ships, at $1,300 each.		3,900
Thirteen clerks to paymasters of second-rate ships, at $1,100 each.		14,000
Fourteen clerks to paymasters of third-rate ships, at $1,000 each.		14,000
Total		25,000

RECAPITULATION.

Total pay for 1,494 officers on the active list	$3,404,950
Total pay for 300 naval cadets	150,000
Total pay for 408 officers on the retired list	902,814
Total pay for 97 clerks	125,000
Total	4,582,764

Detailed statement of the estimate for "Pay of the Navy." Estimate of the amount required to pay the officers of the U. S. Navy for the fiscal year ending June 30, 1896.

ACTIVE LIST.

No.	Grade.	Sea duty.			Other duty.		
		No.	Pay per annum.	Total.	No.	Pay per annum.	Total.
5	Rear-admirals	2	$6,000	$12,000	3	$5,000	$15,000
1	Rear-admiral (chief of bureau)				1	5,000	5,000
10	Commodores	4	5,000	20,000	6	4,000	24,000
2	Captains (chiefs of bureau)				2	5,000	10,000
43	Captains	19	4,500	85,500	24	3,500	84,000
1	Commander (chief of bureau)				1	5,000	5,000
1	Commander (assistant chief of bureau)				1	3,500	3,500
83	Commanders	21	3,500	73,500	62	3,000	186,000
36	Lieutenant-commanders (after 4 years)	14	3,000	42,000	22	2,600	57,200
38	Lieutenant-commanders (first 4 years)	14	2,800	39,200	24	2,400	57,600
1	Lieutenant (Judge-Advocate-General)				1	3,500	3,500
178	Lieutenants (after 5 years)	95	2,600	247,000	83	2,200	182,600
71	Lieutenants (first 5 years)	41	2,400	98,400	30	2,000	60,000
75	Lieutenants (junior grade, first 5 years)	44	1,800	79,200	31	1,500	46,500
1	Lieutenant (not in line of promotion)	1	2,000	2,000			
181	Ensigns (after 5 years)	138	1,400	193,200	43	1,200	51,600
88	Naval cadets (undergraduates)	88	950	83,600			
15	Medical directors (after 20 years from date of commission as surgeons)				15	4,000	60,000
1	Medical inspector (chief of bureau)				1	5,000	5,000
5	Medical inspectors (fleet surgeons)	5	4,400	22,000			
9	Medical inspectors	1	4,200	4,200	8	4,000	32,000
6	Surgeons (fourth 5 years)	4	3,700	14,800	2	3,600	7,200
9	Surgeons (third 5 years)	5	3,500	17,500	4	3,200	12,800
16	Surgeons (second 5 years)	10	3,200	32,000	6	2,800	16,800
19	Surgeons (first 5 years)	8	2,800	22,400	11	2,400	26,400
1	Surgeon (not in line of promotion)				1	2,400	2,400
28	Passed assistant surgeons (after 5 years)	17	2,800	47,600	11	2,000	22,000
28	Passed assistant surgeons (first 5 years)	9	2,000	18,000	19	1,800	34,200
26	Assistant surgeons (first 5 years)	20	1,700	34,000	6	1,400	8,400
1	Pay director (chief of bureau)				1	5,000	5,000
12	Pay directors (after 20 years from date of commission as paymaster)				12	4,000	48,000
2	Pay inspectors (fleet paymasters)	2	4,400	8,800			
11	Pay inspectors				11	4,000	44,000
3	Paymasters (fleet)	3	4,400	13,200			
2	Paymasters (after 20 years)	1	4,200	4,200	1	4,000	4,000
11	Paymasters (fourth 5 years)	6	3,700	22,200	5	3,600	18,000
4	Paymasters (third 5 years)	3	2,500	7,500	1	3,200	3,200
5	Paymasters (second 5 years)	2	3,200	6,400	3	2,800	8,400
15	Paymasters (first 5 years)	9	2,800	25,200	6	2,400	14,400
5	Passed assistant paymasters (after 5 years)	5	2,200	11,000			
15	Passed assistant paymasters (first 5 years)	10	2,000	20,000	5	1,800	9,000
10	Assistant paymasters (first 5 years)	10	1,700	17,000			
1	Chief engineer (chief of bureau)				1	5,000	5,000
5	Chief engineers (fleet engineers)	5	4,400	22,000			
16	Chief engineers (after 20 years)				16	4,000	64,000
4	Chief engineers (fourth 5 years)	1	3,700	3,700	3	3,600	10,800
7	Chief engineers (third 5 years)	4	3,500	14,000	3	3,200	9,600
14	Chief engineers (second 5 years)	9	3,200	28,800	5	2,800	14,000
23	Chief engineers (first 5 years)	11	2,800	30,800	12	2,400	28,800
6	Passed assistant engineers (fourth 5 years)	3	2,700	8,100	3	2,350	7,050
14	Passed assistant engineers (third 5 years)	9	2,400	22,050	5	2,250	11,250
12	Passed assistant engineers (second 5 years)	6	2,200	13,200	6	2,000	12,000
34	Passed assistant engineers (first 5 years)	22	2,000	44,000	12	1,800	21,600
44	Assistant engineers (after 5 years)	31	1,900	58,900	13	1,600	20,800
20	Chaplains (after 5 years)	13	2,800	36,400	7	2,300	16,100
4	Chaplains (first 5 years)	3	2,500	7,500	1	2,000	2,000
6	Professors of mathematics (after 15 years)				6	3,500	21,000
6	Professors of mathematics (third 5 years)				6	3,000	18,000
1	Chief constructor (chief of bureau)				1	5,000	5,000
3	Naval constructors (fourth 5 years)				3	4,000	12,000
4	Naval constructors (second 5 years)				4	3,400	13,600
6	Naval constructors (first 5 years)				6	3,200	19,200
11	Assistant naval constructors (after 8 years)				11	2,600	28,600
7	Assistant naval constructors (after 4 years)				7	2,200	15,400
4	Civil engineers (after 15 years)				4	3,500	14,000
1	Civil engineer (third 5 years)				1	3,000	3,000
7	Civil engineers (second 5 years)				7	2,400	16,800
25	Boatswains (after 12 years from date of appointment)	11	1,800	19,800	14	1,600	22,400
2	Boatswains (third 3 years)	1	1,400	1,400	1	1,300	1,300
6	Boatswains (second 3 years)	4	1,300	5,200	2	1,000	2,000
33	Carpenters (after 12 years from date of appointment)	13	1,800	23,400	20	1,600	32,000
1	Carpenter (fourth 3 years)	1	1,600	1,600			

Detailed statement of the estimate for "Pay of the Navy," etc.—Continued.

ACTIVE LIST—Continued.

No.	Grade.	Sea duty.			Other duty.		
		No.	Pay per annum.	Total.	No.	Pay per annum.	Total.
1	Carpenter (third 3 years)	1	$1,400	$1,400			
1	Carpenter (second 3 years)	1	1,300	1,300			
4	Carpenters (first 3 years)	3	1,200	3,600	1	$900	$900
19	Sailmakers (after 12 years from date of appointment)	7	1,800	12,600	12	1,600	19,200
1	Sailmaker (third 3 years)				1	1,300	1,300
20	Gunners (after 12 years from date of appointment)	7	1,800	12,600	13	1,600	20,800
2	Gunners (third 3 years)	2	1,400	2,800			
18	Gunners (second 3 years)	11	1,300	14,300	7	1,000	7,000
27	Mates	19	900	17,100	8	700	5,600
1,494	Total	809		1,730,150	685		1,674,800

Total pay for 1,494 officers on the active list $3,404,950
Pay for 300 naval cadets under instruction at Naval Academy, at $500 per annum 150,000

Aggregate 3,554,950

Schedule of bids and statement of contracts awarded and entered into for furnishing ice and washing towels for the Navy Department and its bureaus and offices during the fiscal year ending June 30, 1895.

ICE.

Great Falls Ice Co	per 100 pounds	$0.28
Hygienic Ice Co	do	28
Independent Ice Co.*	do	24¾

WASHING TOWELS.

Mrs. M. A. Weaver, Washington, D. C.*	per 100	$0.59
Mrs. Amanda West, Washington, D. C	do	.96
Miss Olivia West, Washington, D. C	do	.48
Mrs. Sallie E. Ogle, Washington, D. C	do	2.50
F. H. Litchfield, Washington, D. C	do	.74
James W. Cotton	do	.70

Statement of proposal for the purchase of waste paper of the Navy Department and its several bureaus and offices during the fiscal year ending June 30, 1895, received under the Department's advertisement of June 13, 1894 (per 100 pounds).

E. G. Wheeler, for Mrs. S. A. Wheeler, Washington, D. C.* $0.32¼

Schedule of bids and statement of contracts awarded and entered into to furnish stationery for the Navy Department and the bureaus and offices thereof for the fiscal year ending June 30, 1895.

Bidder.	Items.										
	1	2	3	4	5	6	7	8	9	10	11
Manhattan Supply Co., New York	*$3.20	*$3.20	*$1.48	*$1.48	*$1.48	*$1.73	*$1.73	$2.10	$1.15	*$1.50	*$0.60
Wm. H. Teepe, Washington, D. C								*1.68			
R. Carter Ballantyne, Washington, D. C	4.06	4.06	1.64	2.36	1.95	1.99	2.16				
Easton & Rupp, Washington, D. C	4.04	4.04	1.68	2.38	1.98	2.05	2.18	2.00	*.85	1.65	.60

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.								
	12	13	14	15	16	17	18	19	20
Manhattan Supply Co., New York	$2.20	$2.40	$3.20	$4.70	$7.00	$1.45	$1.87	$2.20	$2.73
Wm. H. Teepe, Washington, D. C	.....	3.30	3.30	5.00	.....	1.16	1.56	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	A, .51 No. 10, .62 No. 11, .80 No. 12, .96 No. 13, 1.37	.61 .74 .98 1.20 1.41	.....	.....
Easton & Rupp, Washington, D. C	*1.70	*2.25	*3.00	*4.50	*5.80	*1.34	*1.60	*1.50	*1.86
Valley Paper Co., Holyoke, Mass	.....	.....	.....	.....	.....	D, .91 E, 1.12	D, 1.13 E, 1.49	A, .87 C, 1.26	A, 1.08 C, 1.50

Bidder.	Items.									
	21	22	23	24	25	26	27	28	29	30
Manhattan Supply Co., New York	$3.10	$2.10	$2.67	$0.90	$1.20	$5.90	*$1.29	*$1.50	*$2.40	*$3.50
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	1.17	1.26	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	.....	1.27	1.53	2.18	2.94
Easton & Rupp, Washington, D. C	*1.86	*1.86	*2.32	.90	1.10	*4.25	1.30	1.54	2.18	2.96
Valley Paper Co., Holyoke, Mass	A, 1.08 C, 1.50	A, .87 C, 1.26	A, 1.08 C, 1.50	.....	.....	.....	.....	.....	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	.....	*.48 .75	*.60 .90	.....	.....	.....	.....	.....

Bidder.	Items.									
	31	32	33	34	35	36	37	38	39	40
Manhattan Supply Co., New York	*$11.00	*$2.40	*$2.35	*$2.45	*$2.10	*$2.40	*$2.20	*$3.55	*$9.00	$8.00
Wm. H. Teepe, Washington, D. C	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	15.44	2.76	2.47	2.92	2.34	2.46	2.34	4.05	.....	.....
Easton & Rupp, Washington, D. C	16.00	2.80	2.52	2.96	2.34	2.48	2.40	4.00	10.20	*7.25

Bidder.	Items.									
	41	42	43	44	45	46	47	48	49	50
Manhattan Supply Co., New York	*$1.80	*$2.00	$16.00	$23.00	$48.00	*$1.20	$3.60	*$4.00	$5.00	$5.00
Wm. H. Teepe, Washington, D. C	.....	.....	*15.50	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	1.98	2.37	16.00	20.00	45.28	1.42	3.50	4.38	4.68	4.90
Easton & Rupp, Washington, D. C	2.00	2.40	15.85	*20.00	*44.60	1.44	*3.48	4.34	*4.64	*4.90

Bidder.	Items.									
	51	52	53	54	55	56	57	58	59	60
Manhattan Supply Co., New York	*$7.00	*$7.00	$5.90	$5.90	$11.90	$11.90	$5.90	*$5.20	$12.00	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.09 $\frac{1}{10}$
R. Carter Ballantyne, Washington, D. C	6.68	11.28	4.60	4.60	4.60	4.60	4.60	4.60	4.60	.32
Easton & Rupp, Washington, D. C	6.76	11.30	*5.50	*5.50	*11.75	*11.75	*5.50	5.50	*11.15	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	.....
Rowe Typewriter Ribbon Co., New York	.....	.....	3.98	3.98	3.98	3.98	3.98	3.98	3.98	.....

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	61	62	63	64	65	66	67	68	69	70
Columbia Rubber Works Co., New York	*$0.45	*$0.56	*$0.63	*$0.82	*$0.21¼	*$0.28¼	*$0.32½	*$0.38	*$0.15½	*$0.43¼
R. Carter Ballantyne, Washington, D. C.	1.03½	.94½	1.13	.85	.38	.47	.57	.66	.32	.76

Bidder.	Items.								
	71	72	73	74	75	76	77	78	79
Columbia Rubber Works Co., New York	*$0.03¼	*$0.04¾	*$0.06	*$0.07 4/16	*$0.08 1/16	*$0.08 6/16	*$0.10	*$0.11	*$0.14 1/16
R. Carter Ballantyne, Washington, D. C.	.06	.08	.09¾	.11¼	.12	.13	.14½	.26½	.31

Bidder.	Items.										
	80	81	82	83	84	85	86	87	88	89	90
Columbia Rubber Works Co., New York	*$0.16¾	*$0.19½	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C.	.....	.....	$0.60	.....	$0.60	$0.60	$0.60	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C.	.34½	.38	*.47½	.....	*.47½	*.47¼	*.47½	*$0.23	*$0.23	*$0.23	$0.76
Easton & Rupp, Washington, D. C.	.....	.....	.22 .40 .26 .47½	*$0.26	.22 .40 .26 .47½	.22 .40 .26 .47½	.22 .40 .26 .47½	.60	.60	.60	.60
C. S. Braisted, New York	.....	.....	.30	.30	.30	.30	.30	.50	.50	.50	*.50

Bidder.	Items.									
	91	92	93	94	95	96	97	98	99	100
R. Carter Ballantyne, Washington, D. C.	$0.76	*$0.23	$0.41	$0.31	$0.31	$0.31	$0.54	*$0.16	$0.59	*$0.23
Easton & Rupp, Washington, D. C.	.60	.60	.60	.48	.48	.48	.48	.23 .16 .30	*.48 .28	.30
C. S. Braisted, New York	*.50	.50	*.32	*.25	*.25	*.25	*.25	.19	.30	.40

Bidder.	Items.									
	101	102	103	104	105	106	107	108	109	110
Manhattan Supply Co., New York	$0.50	$1.28	$0.85	$0.44	$0.73	$0.73	*$0.70	*$0.70	*$0.70	*$0.70
R. Carter Ballantyne, Washington, D. C.	*.41	1.08	*.70	*.38	*.66	*.66	.90	.90	.90	.90
Easton & Rupp, Washington, D. C.	.45	*.81	.72	.40	.69	.69	.80	.80	.80	.80

Bidder.	Items.									
	111	112	113	114	115	116	117	118	119	120
Manhattan Supply Co., New York	*$0.70	$0.60	$0.60	$0.73	$0.70	$0.70	$0.70	$0.70	*$0.38	$0.47
R. Carter Ballantyne, Washington, D. C.	.90	*.53½	*.53½	*.66	*.68	*.68	*.68	*.68	.38½	.42
Easton & Rupp, Washington, D. C.	.80	.60	.60	.70	.70	.70	.75	.75	.39	*.40

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.								
	12	13	14	15	16	17	18	19	20
Manhattan Supply Co., New York	$2.20	$2.40	$3.20	$4.70	$7.00	$1.45	$1.87	$2.20	$2.73
Wm. H. Teepe, Washington, D. C	.....	3.30	3.30	5.00	.....	1.16	1.56	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	A, .51 No. 10, .62 No. 11, .80 No. 12, .96 No. 13, 1.37	.61 .74 .98 1.20 1.41	.....	.....
Easton & Rupp, Washington, D. C	*1.70	*2.25	*3.00	*4.50	*5.80	*1.34	*1.60	*1.50	*1.86
Valley Paper Co., Holyoke, Mass	.....	.....	.....	.....	.....	D, .91 E, 1.12	D, 1.13 E, 1.49	A, .87 C, 1.26	A, 1.08 C, 1.50

Bidder.	Items.									
	21	22	23	24	25	26	27	28	29	30
Manhattan Supply Co., New York	$3.10	$2.10	$2.67	$0.90	$1.20	$5.90	*$1.29	*$1.50	*$2.40	*$3.50
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	1.17	1.26	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	.....	1.27	1.53	2.18	2.94
Easton & Rupp, Washington, D. C	*1.86	*1.86	*2.32	.90	1.10	*4.25	1.30	1.54	2.18	2.96
Valley Paper Co., Holyoke, Mass	A, 1.08 C, 1.50	A, .87 C, 1.26	A, 1.08 C, 1.50	.....	.....	.....	.....	.....	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	.....	*.48 .75	*.60 .90	.....	.....	.....	.....	.....

Bidder.	Items.									
	31	32	33	34	35	36	37	38	39	40
Manhattan Supply Co., New York	*$11.00	*$2.40	*$2.35	*$2.45	*$2.10	*$2.40	*$2.20	*$3.55	*$9.00	$8.00
Wm. H. Teepe, Washington, D. C	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	15.44	2.76	2.47	2.92	2.34	2.46	2.34	4.05	.....	.....
Easton & Rupp, Washington, D. C	16.00	2.80	2.52	2.96	2.34	2.48	2.40	4.00	10.20	*7.25

Bidder.	Items.									
	41	42	43	44	45	46	47	48	49	50
Manhattan Supply Co., New York	*$1.80	*$2.00	$16.00	$23.00	$48.00	*$1.20	$3.60	*$4.00	$5.00	$5.00
Wm. H. Teepe, Washington, D. C	.....	.....	*15.50	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	1.98	2.37	16.00	20.00	45.28	1.42	3.50	4.38	4.68	4.90
Easton & Rupp, Washington, D. C	2.00	2.40	15.85	*20.00	*44.60	1.44	*3.48	4.34	*4.64	*4.90

Bidder.	Items.									
	51	52	53	54	55	56	57	58	59	60
Manhattan Supply Co., New York	*$7.00	*$7.00	$5.90	$5.90	$11.90	$11.90	$5.90	*$5.20	$12.00	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.09
R. Carter Ballantyne, Washington, D. C	6.68	11.28	4.60	4.60	4.60	4.60	4.60	4.60	4.60	.32
Easton & Rupp, Washington, D. C	6.76	11.30	*5.50	*5.50	*11.75	*11.75	*5.50	5.50	*11.15	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	.....
Rowe Typewriter Ribbon Co., New York	.....	.....	3.98	3.98	3.98	3.98	3.98	3.98	3.98	.....

*Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	61	62	63	64	65	66	67	68	69	70
Columbia Rubber Works Co., New York	*$0.45	*$0.56	*$0.63	*$0.82	*$0.21¼	*$0.28¼	*$0.32½	*$0.38	*$0.15½	*$0.43¼
R. Carter Ballantyne, Washington, D. C.	1.03½	.94½	1.13	.85	.38	.47	.57	.66	.32	.76

Bidder.	Items.								
	71	72	73	74	75	76	77	78	79
Columbia Rubber Works Co., New York	*$0.03¼	*$0.04¾	*$0.06	*$0.07 4/16	*$0.08 1/16	*$0.08 4/16	*$0.10	*$0.11	*$0.14 1/16
R. Carter Ballantyne, Washington, D. C.	.06	.08	.09¾	.11¼	.12	.13	.14½	.26½	.31

Bidder.	Items.										
	80	81	82	83	84	85	86	87	88	89	90
Columbia Rubber Works Co., New York	*$0.16¾	*$0.19½	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C.	.....	.....	$0.60	.....	$0.60	$0.60	$0.60	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C.	.34½	.38	*.47¼	.....	*.47¼	*.47¼	*.47¼	*$0.23	*$0.23	*$0.23	$0.76
Easton & Rupp, Washington, D. C.	.....	.....	.22 .40 .26 .47½	*$0.26	.22 .40 .26 .47½	.22 .40 .26 .47½	.22 .40 .26 .47½	.60	.60	.60	.60
C. S. Braisted, New York	.....	.....	.30	.30	.30	.30	.30	.50	.50	.50	*.50

Bidder.	Items.									
	91	92	93	94	95	96	97	98	99	100
R. Carter Ballantyne, Washington, D. C.	$0.76	*$0.23	$0.41	$0.31	$0.31	$0.31	$0.54	*$0.16	$0.50	*$0.23
Easton & Rupp, Washington, D. C.	.60	.60	.60	.48	.48	.48	.48	.23 .16 .30	*.48 .28	.30
C. S. Braisted, New York	*.50	.50	*.32	*.25	*.25	*.25	*.25	.19	.30	.40

Bidder.	Items.									
	101	102	103	104	105	106	107	108	109	110
Manhattan Supply Co., New York	$0.50	$1.28	$0.85	$0.44	$0.73	$0.73	*$0.70	*$0.70	*$0.70	*$0.70
R. Carter Ballantyne, Washington, D. C.	*.41	1.08	*.70	*.38	*.66	*.66	.90	.90	.90	.90
Easton & Rupp, Washington, D. C.	.45	*.81	.72	.40	.69	.69	.80	.80	.80	.80

Bidder.	Items.									
	111	112	113	114	115	116	117	118	119	120
Manhattan Supply Co., New York	*$0.70	$0.60	$0.60	$0.73	$0.70	$0.70	$0.70	$0.70	*$0.38	$0.47
R. Carter Ballantyne, Washington, D. C.	.90	*.53½	*.53½	*.66	*.68	*.68	*.68	*.68	.38½	.42
Easton & Rupp, Washington, D. C.	.80	.60	.60	.70	.70	.70	.75	.75	.39	*.40

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.								
	12	13	14	15	16	17	18	19	20
Manhattan Supply Co., New York	$2.20	$2.40	$3.20	$4.70	$7.00	$1.45	$1.87	$2.20	$2.7[illegible]
Wm. H. Teepe, Washington, D. C	.....	3.30	3.30	5.00	.....	1.16	1.56	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	A, .51 No. 10, .62 No. 11, .80 No. 12, .96 No. 13, 1.37	.61 .74 .98 1.20 1.41	.....	.....
Easton & Rupp, Washington, D. C	*1.70	*2.25	*3.00	*4.50	*5.80	*1.34	*1.60	*1.50	*1.86
Valley Paper Co., Holyoke, Mass	.....	.....	.....	.....	.....	D, .91 E, 1.12	D, 1.13 E, 1.49	A, .87 C, 1.26	A, 1.08 C, 1.50

Bidder.	Items.									
	21	22	23	24	25	26	27	28	29	30
Manhattan Supply Co., New York	$3.10	$2.10	$2.67	$0.90	$1.20	$5.90	*$1.29	*$1.50	*$2.40	*$3.50
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	1.17	1.26	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	.....	1.27	1.53	2.18	2.94
Easton & Rupp, Washington, D. C	*1.86	*1.86	*2.32	.90	1.10	*4.25	1.30	1.54	2.18	2.96
Valley Paper Co., Holyoke, Mass	A, 1.08 C, 1.50	A, .87 C, 1.26	A, 1.08 C, 1.50	.....	.....	.....	.....	.....	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	.....	*.48 .75	*.60 .90	.....	.....	.....	.....	.....

Bidder.	Items.									
	31	32	33	34	35	36	37	38	39	40
Manhattan Supply Co., New York	*$11.00	*$2.40	*$2.35	*$2.45	*$2.10	*$2.40	*$2.20	*$3.55	*$9.00	$8.00
Wm. H. Teepe, Washington, D. C	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	15.44	2.76	2.47	2.92	2.34	2.46	2.34	4.05	.....	.....
Easton & Rupp, Washington, D. C	16.00	2.80	2.52	2.96	2.34	2.48	2.40	4.00	10.20	*7.25

Bidder.	Items.									
	41	42	43	44	45	46	47	48	49	50
Manhattan Supply Co., New York	*$1.80	*$2.00	$16.00	$23.00	$48.00	*$1.20	$3.60	*$4.00	$5.00	$5.00
Wm. H. Teepe, Washington, D. C	.....	.....	*15.50	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	1.98	2.37	16.00	20.00	45.28	1.42	3.50	4.38	4.68	4.90
Easton & Rupp, Washington, D. C	2.00	2.40	15.85	*20.00	*44.60	1.44	*3.48	4.34	*4.64	*4.90

Bidder.	Items.									
	51	52	53	54	55	56	57	58	59	60
Manhattan Supply Co., New York	*$7.00	*$7.00	$5.90	$5.90	$11.90	$11.90	$5.90	*$5.20	$12.00	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.09½
R. Carter Ballantyne, Washington, D. C	6.68	11.28	4.60	4.60	4.60	4.60	4.60	4.60	4.60	.32
Easton & Rupp, Washington, D. C	6.76	11.30	*5.50	*5.50	*11.75	*11.75	*5.50	5.50	*11.15	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	.....
Rowe Typewriter Ribbon Co., New York	.....	.....	3.98	3.98	3.98	3.98	3.98	3.98	3.98	.....

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	61	62	63	64	65	66	67	68	69	70
Columbia Rubber Works Co., New York	*$0.45	*$0.56	*$0.63	*$0.82	*$0.21¼	*$0.28¼	*$0.32½	*$0.38	*$0.15½	*$0.43¼
R. Carter Ballantyne, Washington, D. C.	1.03½	.94½	1.13	.85	.38	.47	.57	.66	.32	.76

Bidder.	Items.								
	71	72	73	74	75	76	77	78	79
Columbia Rubber Works Co., New York	*$0.03¼	*$0.04¾	*$0.06	*$0.07 4/10	*$0.08 1/10	*$0.08 4/10	*$0.10	*$0.11	*$0.14 1/10
R. Carter Ballantyne, Washington, D. C.	.06	.08	.09¾	.11¼	.12	.13	.14½	.26½	.31

Bidder.	Items.										
	80	81	82	83	84	85	86	87	88	89	90
Columbia Rubber Works Co., New York	*$0.16¾	*$0.19½	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C.	.....	.....	$0.60	.....	$0.60	$0.60	$0.60	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C.	.34½	.38	*.47½ .22	.....	*.47½ .22	*.47½ .22	*.47½ .22	*$0.23	*$0.23	*$0.23	$0.76
Easton & Rupp, Washington, D. C.	.....	.....	.40 .26 .47½	*$0.26	40 .26 .47½	.40 .26 .47½	.40 .26 .47½	.60	.60	.60	.60
C. S. Braisted, New York	.....	.....	.30	.30	.30	.30	.30	.50	.50	.50	*.50

Bidder.	Items.									
	91	92	93	94	95	96	97	98	99	100
R. Carter Ballantyne, Washington, D. C.	$0.76	*$0.23	$0.41	$0.31	$0.31	$0.31	$0.54	*$0.16	$0.50	*$0.23
Easton & Rupp, Washington, D. C.	.60	.60	.60	.48	.48	.48	.48	.23 .16 .30	*.48 .28	.30
C. S. Braisted, New York	*.50	.50	*.32	*.25	*.25	*.25	*.25	.19	.30	.40

Bidder.	Items.									
	101	102	103	104	105	106	107	108	109	110
Manhattan Supply Co., New York	$0.50	$1.28	$0.85	$0.44	$0.73	$0.73	*$0.70	*$0.70	*$0.70	*$0.70
R. Carter Ballantyne, Washington, D. C.	*.41	1.08	*.70	*.38	*.66	*.66	.90	.90	.90	.90
Easton & Rupp, Washington, D. C.	.45	*.81	.72	.40	.69	.69	.80	.80	.80	.80

Bidder.	Items.									
	111	112	113	114	115	116	117	118	119	120
Manhattan Supply Co., New York	*$0.70	$0.60	$0.60	$0.73	$0.70	$0.70	$0.70	$0.70	*$0.38	$0.47
R. Carter Ballantyne, Washington, D. C.	.90	*.53½	*.53½	*.66	*.68	*.68	*.68	*.68	.38½	.42
Easton & Rupp, Washington, D. C.	.80	.60	.60	.70	.70	.70	.75	.75	.39	*.40

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued

Bidder.	Items.								
	12	13	14	15	16	17	18	19	20
Manhattan Supply Co., New York	$2.20	$2.40	$3.20	$4.70	$7.00	$1.45	$1.87	$2.20	*$2
Wm. H. Teepe, Washington, D. C	.....	3.30	3.30	5.00	.....	1.16	1.56	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	A, .51 No. 10, .62 No. 11, .80 No. 12, .96 No. 13, 1.37	.61 .74 .98 1.20 1.41	.....	.....
Easton & Rupp, Washington, D. C	*1.70	*2.25	*3.00	*4.50	*5.80	*1.34	*1.60	*1.50	*1
Valley Paper Co., Holyoke, Mass	.....	.....	.....	.....	.....	D, .91 E, 1.12	D, 1.13 E, 1.49	A, .87 C, 1.26	A, 1 C, 1

Bidder.	Items.									
	21	22	23	24	25	26	27	28	29	30
Manhattan Supply Co., New York	$3.10	$2.10	$2.67	$0.90	$1.20	$5.90	*$1.29	*$1.50	*$2.40	*$3
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	1.17	1.26	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	.....	1.27	1.53	2.18	2
Easton & Rupp, Washington, D. C	*1.86	*1.86	*2.32	.90	1.10	*4.25	1.30	1.54	2.18	2
Valley Paper Co., Holyoke, Mass	A, 1.08 C, 1.50	A, .87 C, 1.26	A, 1.08 C, 1.50	.....	.....	.....	.....	.....	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	.....	*.48 .75	*.60 .90	.....	.....	.....	.....	.....

Bidder.	Items.									
	31	32	33	34	35	36	37	38	39	40
Manhattan Supply Co., New York	*$11.00	*$2.40	*$2.35	*$2.45	*$2.10	*$2.40	*$2.20	*$3.55	*$9.00	$8
Wm. H. Teepe, Washington, D. C	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	15.44	2.76	2.47	2.92	2.34	2.46	2.34	4.05	.....	.....
Easton & Rupp, Washington, D. C	16.00	2.80	2.52	2.96	2.34	2.48	2.40	4.00	10.20	*7

Bidder.	Items.									
	41	42	43	44	45	46	47	48	49	50
Manhattan Supply Co., New York	*$1.80	*$2.00	$16.00	$23.00	$48.00	*$1.20	$3.60	*$4.00	$5.00	$5
Wm. H. Teepe, Washington, D. C	.....	.....	*15.50	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	1.98	2.37	16.00	20.00	45.28	1.42	3.50	4.38	4.68	4
Easton & Rupp, Washington, D. C	2.00	2.40	15.85	*20.00	*44.60	1.44	*3.48	4.34	*4.64	*4

Bidder.	Items.									
	51	52	53	54	55	56	57	58	59	60
Manhattan Supply Co., New York	*$7.00	*$7.00	$5.90	$5.90	$11.90	$11.90	$5.90	*$5.20	$12.00	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.0
R. Carter Ballantyne, Washington, D. C	6.68	11.28	4.60	4.60	4.60	4.60	4.60	4.60	4.60	.3
Easton & Rupp, Washington, D. C	6.76	11.30	*5.50	*5.50	*11.75	*11.75	*5.50	5.50	*11.15	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	.....
Rowe Typewriter Ribbon Co., New York	.....	.....	3.98	3.98	3.98	3.98	3.98	3.98	3.98	.....

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	61	62	63	64	65	66	67	68	69	70
Columbia Rubber Works Co., New York	*$0.45	*$0.56	*$0.63	*$0.82	*$0.21¼	*$0.28¼	*$0.32½	*$0.38	*$0.15½	*$0.43¼
R. Carter Ballantyne, Washington, D. C.	1.03½	.94½	1.13	.85	.38	.47	.57	.66	.32	.76

Bidder.	Items.								
	71	72	73	74	75	76	77	78	79
Columbia Rubber Works Co., New York	*$0.03¼	*$0.04¾	*$0.06	*$0.07 4/10	*$0.08 1/10	*$0.08 6/10	*$0.10	*$0.11	*$0.14 1/10
R. Carter Ballantyne, Washington, D. C.	.06	.08	.09¾	.11¼	.12	.13	.14½	.26½	.31

Bidder.	Items.										
	80	81	82	83	84	85	86	87	88	89	90
Columbia Rubber Works Co., New York	*$0.16¾	*$0.19½	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C.	.....	.....	$0.60	.....	$0.60	$0.60	$0.60	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C.	.34½	.38	*.47½ .22	.....	*.47¼ .22	*.47¼ .22	*.47¾ .22	*$0.23	*$0.23	*$0.23	$0.76
Easton & Rupp, Washington, D. C.	.....	.....	.40 .26 .47½	*$0.26	40 .26 .47½	.40 .26 .47½	.40 .26 .47½	.60	.60	.60	.60
C. S. Braisted, New York	.....	.....	.30	.30	.30	.30	.30	.50	.50	.50	*.50

Bidder.	Items.									
	91	92	93	94	95	96	97	98	99	100
R. Carter Ballantyne, Washington, D. C.	$0.76	*$0.23	$0.41	$0.31	$0.31	$0.31	$0.54	*$0.16	$0.50	*$0.23
Easton & Rupp, Washington, D. C.	.60	.60	.60	.48	.48	.48	.48	.23 .16 .30	*.48 .28	.30
C. S. Braisted, New York	*.50	.50	*.32	*.25	*.25	*.25	*.25	.19	.30	.40

Bidder.	Items.									
	101	102	103	104	105	106	107	108	109	110
Manhattan Supply Co., New York	$0.50	$1.28	$0.85	$0.44	$0.73	$0.73	*$0.70	*$0.70	*$0.70	*$0.70
R. Carter Ballantyne, Washington, D. C.	*.41	1.08	*.70	*.38	*.66	*.66	.90	.90	.90	.90
Easton & Rupp, Washington, D. C.	.45	*.81	.72	.40	.69	.69	.80	.80	.80	.80

Bidder.	Items.									
	111	112	113	114	115	116	117	118	119	120
Manhattan Supply Co., New York	*$0.70	$0.60	$0.60	$0.73	$0.70	$0.70	$0.70	$0.70	*$0.38	$0.47
R. Carter Ballantyne, Washington, D. C.	.90	*.53½	*.53½	*.66	*.68	*.68	*.68	*.68	.38½	.42
Easton & Rupp, Washington, D. C.	.80	.60	.60	.70	.70	.70	.75	.75	.39	*.40

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued

Bidder.	Items.								
	12	13	14	15	16	17	18	19	20
Manhattan Supply Co., New York	$2.20	$2.40	$3.20	$4.70	$7.00	$1.45	$1.87	$2.20	$2.
Wm. H. Teepe, Washington, D. C	.....	3.30	3.30	5.00	.....	1.16	1.56	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	A, .51 No. 10, .62 No. 11, .80 No. 12, .96 No. 13, 1.37	.61 .74 .98 1.20 1.41	.....	.....
Easton & Rupp, Washington, D. C	*1.70	*2.25	*3.00	*4.50	*5.80	*1.34	*1.60	*1.50	*1.
Valley Paper Co., Holyoke, Mass	.....	.....	.....	.....	.....	D, .91 E, 1.12	D, 1.13 E, 1.49	A, .87 C, 1.26	A, 1. C, 1.

Bidder.	Items.									
	21	22	23	24	25	26	27	28	29	30
Manhattan Supply Co., New York	$3.10	$2.10	$2.67	$0.90	$1.20	$5.90	*$1.20	*$1.50	*$2.40	*$3.
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	1.17	1.26	.....	.....
R. Carter Ballantyne, Washington, D. C	.....	.....	.....	.....	.....	.....	1.27	1.53	2.18	2.
Easton & Rupp, Washington, D. C	*1.86	*1.86	*2.32	.90	1.10	*4.25	1.30	1.54	2.18	2.
Valley Paper Co., Holyoke, Mass	A, 1.08 C, 1.50	A, .87 C, 1.26	A, 1.08 C, 1.50	.....	.....	.....	.....	.....	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	.....	*.48 .75	*.60 .90	.....	.....	.....	.....	.....

Bidder.	Items.									
	31	32	33	34	35	36	37	38	39	40
Manhattan Supply Co., New York	*$11.00	*$2.40	*$2.35	*$2.45	*$2.10	*$2.40	*$2.20	*$3.55	*$9.00	$8.
Wm. H. Teepe, Washington, D. C	.....	1.55	.....	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	15.44	2.76	2.47	2.92	2.34	2.46	2.34	4.05	.....	.....
Easton & Rupp, Washington, D. C	16.00	2.80	2.52	2.96	2.34	2.48	2.40	4.00	10.20	*7.

Bidder.	Items.									
	41	42	43	44	45	46	47	48	49	50
Manhattan Supply Co., New York	*$1.80	*$2.00	$16.00	$23.00	$48.00	*$1.20	$3.60	*$4.00	$5.00	$5.
Wm. H. Teepe, Washington, D. C	.....	.....	*15.50	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	1.98	2.37	16.00	20.00	45.28	1.42	3.50	4.38	4.68	4.
Easton & Rupp, Washington, D. C	2.00	2.40	15.85	*20.00	*44.60	1.44	*3.48	4.34	*4.64	*.

Bidder.	Items.									
	51	52	53	54	55	56	57	58	59	60
Manhattan Supply Co., New York	*$7.00	*$7.00	$5.90	$5.90	$11.90	$11.90	$5.90	*$5.20	$12.00	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	*$0.0
R. Carter Ballantyne, Washington, D. C	6.68	11.28	4.60	4.60	4.60	4.60	4.60	4.60	4.60	.3
Easton & Rupp, Washington, D. C	6.76	11.30	*5.50	*5.50	*11.75	*11.75	*5.50	5.50	*11.15	.....
Wyckoff, Seamans & Benedict, Washington, D. C	.....	.....	5.00	5.00	5.00	5.00	5.00	5.00	5.00	.....
Rowe Typewriter Ribbon Co., New York	.....	.....	3.98	3.98	3.98	3.98	3.98	3.98	3.98	.....

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	61	62	63	64	65	66	67	68	69	70
Columbia Rubber Works Co., New York	*$0.45	*$0.56	*$0.63	*$0.82	*$0.21¼	*$0.28¼	*$0.32½	*$0.38	*$0.15½	*$0.43¼
R. Carter Ballantyne, Washington, D. C.	1.03½	.94½	1.13	.85	.38	.47	.57	.66	.32	.76

Bidder.	Items.								
	71	72	73	74	75	76	77	78	79
Columbia Rubber Works Co., New York	*$0.03¼	*$0.04¾	*$0.06	*$0.07 4/10	*$0.08 1/10	*$0.08 6/10	*$0.10	*$0.11	*$0.14 1/10
R. Carter Ballantyne, Washington, D. C.	.06	.08	.09¾	.11¼	.12	.13	.14½	.26½	.31

Bidder.	Items.										
	80	81	82	83	84	85	86	87	88	89	90
Columbia Rubber Works Co., New York	*$0.16¾	*$0.19½	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C.	.....	.....	$0.60	.....	$0.60	$0.60	$0.60	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C.	.34½	.38	*.47½	.....	*.47¼	*.47¼	*.47¼	*$0.23	*$0.23	*$0.23	$0.76
Easton & Rupp, Washington, D. C.	.....	.....	.22 .40 .26 .47½	*$0.26	.22 40 .26 .47½	.22 .40 .26 .47½	.22 .40 .26 .47½	.60	.60	.60	.60
C. S. Braisted, New York	.....	.....	.30	.30	.30	.30	.30	.50	.50	.50	*.50

Bidder.	Items.									
	91	92	93	94	95	96	97	98	99	100
R. Carter Ballantyne, Washington, D. C.	$0.76	*$0.23	$0.41	$0.31	$0.31	$0.31	$0.54	*$0.16	$0.59	*$0.23
Easton & Rupp, Washington, D. C.	.60	.60	.60	.48	.48	.48	.48	.23 .16 .30	*.48 .28	.30
C. S. Braisted, New York	*.50	.50	*.32	*.25	*.25	*.25	*.25	.19	.30	.40

Bidder.	Items.									
	101	102	103	104	105	106	107	108	109	110
Manhattan Supply Co., New York	$0.50	$1.28	$0.85	$0.44	$0.73	$0.73	*$0.70	*$0.70	*$0.70	*$0.70
R. Carter Ballantyne, Washington, D. C.	*.41	1.08	*.70	*.38	*.66	*.66	.90	.90	.90	.90
Easton & Rupp, Washington, D. C.	.45	*.81	.72	.40	.69	.69	.80	.80	.80	.80

Bidder.	Items.									
	111	112	113	114	115	116	117	118	119	120
Manhattan Supply Co., New York	*$0.70	$0.60	$0.60	$0.73	$0.70	$0.70	$0.70	$0.70	*$0.38	$0.47
R. Carter Ballantyne, Washington, D. C.	.90	*.53½	*.53½	*.66	*.68	*.68	*.68	*.68	.38½	.42
Easton & Rupp, Washington, D. C.	.80	.60	.60	.70	.70	.70	.75	.75	.39	*.40

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	121	122	123	124	125	126	127	128	129	130
Manhattan Supply Co., New York	$0.50	$0.50	$0.50	$0.40	$0.37	$0.35	$0.40	$1.12½	$0.75	$0.75
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	.....	.....	.....	.....	*.60	*.60
R. Carter Ballantyne, Washington, D. C	.49	.49	.49	.39	*.36	*.33	.40	1.00	.76	.76
Easton & Rupp, Washington, D. C	*.45	*.47	*.47	*.38	.38	.35	*.40	*.85	.75	.75

Bidder.	Items.									
	131	132	133	134	135	136	137	138	139	140
Manhattan Supply Co., New York	$0.75	$0.75	$0.75	$0.35	*$0.33	$0.50	$0.17	$0.44	$0.64	$0.12 4/10
Wm. H. Teepe, Washington, D. C	*.60	*.60	*.60	.....	.....	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	.76	.76	.76	*.27	.42	.61	*.13½	*.38	.59½	.11¾
Easton & Rupp, Washington, D. C	.75	.75	.75	.40	.....	*.30	.....	.40	*.55	*.11

Bidder.	Items.									
	141	142	143	144	145	146	147	148	149	150
Manhattan Supply Co., New York	$0.40	$0.65	*$0.48	$0.33	$0.30	$0.34	$0.14	$1.40	$0.25	$0.40
R. Carter Ballantyne, Washington, D. C	*.36	.56	.49	.30	.28	.30½	*.10½	1.22	*.19½	.30
Easton & Rupp, Washington, D. C	.37	*.50	.48	*.26	*.26	*.30	.11	*.93	.....	*.26

Bidder.	Items.									
	151	152	153	154	155	156	157	158	159	160
Manhattan Supply Co., New York	$0.03½	$0.03 4/10	$6.40	.....	$0.07	$0.16	$0.10	$6.15	.....	.....
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	.....	.....	*$0.59	.....
Wm. H. Teepe, Washington, D. C	.02¾	.02⅛	.....	.....	*.06	.11	.15	.25	.....	.....
R. Carter Ballantyne, Washington, D. C	.02	.01⅛ .01 7/10 .02⅛	.....	*$0.01⅛	.06¼ .06¾	.12½	*.08	*.13	.....	$0.27¾
Easton & Rupp, Washington, D. C	.02 5/10	*.02	*4.40	.01½	.07½	*.09	.....	.....	.85	*.26
Shoemaker & Bush, Philadelphia, Pa	.....	.....	.....	.....	.06¾	.09½	.06½	.06½	.....	.....
Wyckoff, Seamans & Benedict, Washington, D. C	*.01½	.....	.....	.....	.....	.....	.12½	.....	.....	.....
C. S. Braisted, New York	.....	.....	.....	.....	.....	.....	.....	.....	.....	.27

Bidder.	Items.									
	161	162	163	164	165	166	167	168	169	170
Columbia Rubber Works Co., New York	.....	.....	.....	.....	.....	.....	$0.01 5/10	$0.04½	.....	.....
R. Carter Ballantyne, Washington, D. C	*$0.30¾	$0.33¾	.....	*$0.33	.....	.....	.03	.06	$0.08	$0.08¾
Easton & Rupp, Washington, D. C	.32	.40	*$0.45	.40	*$1.10	*$0.35	.03	.06	.06	.05
C. S. Braisted, New York	.31	.33	.....	.....	.....	.....	*.01¾	*.04½	*.04½	*.04½

* Contract awarded.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	171	172	173	174	175	176	177	178	179	180
Columbia Rubber Works Co., New York	$0.02 8/10	.....	.....	.....	$0.05½	*$0.01 8/10	.....	.....	.....	.....
Wm. H. Teepe, Washington, D. C	.07	.....	.....	.....	.....	.05	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	.04½	.....	*$0.06	*$0.14¼	.07	.02½	*$0.02¾	$0.12	$2.00	*$0.11
Easton & Rupp, Washington, D. C	.03½	$0.06	.07	.12	.20	.02¼	.03	.13	*1.90	.12
C. S. Braisted, New York	*.02 5/10	*.04½	.....	.....	*.05	.02	.....	*.07¾	.....	.....
John H. Chesley & Co., Washington, D. C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.09

Bidder.	Items.									
	181	182	183	184	185	186	187	188	189	190
Wm. H. Teepe, Washington, D. C	.....	.....	.....	.....	$0.15	.....	.....	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	*$0.24	*$0.03¼	*$0.03	*$0.02¾	*.08	*$1.80	$0.08	$0.10	$0.13	.....
Easton & Rupp, Washington, D. C	.18	.04	.04	.03½	.09	1.90	*.06¼	*.07½	*.10	*$0.15
John H. Chesley & Co., Washington, D. C	.10½	.....	.....	.....	.....	.....	.....	.....	.....	.....

Bidder.	Items.									
	191	192	193	194	195	196	197	198	199	200
Manhattan Supply Co., New York	.....	.....	.....	$2.00	$1.40	$6.40	$0.68	$1.35	.....	*$0.05
R. Carter Ballantyne, Washington, D. C	.....	.....	$1.56	.....	.....	.....	.....	.....	.....	.....
Easton & Rupp, Washington, D. C	*$0.65	*†$0.43	*3.40	*2.60	*1.35	*2.10	*.60	*.77	*$0.95	.....

Bidder.	Items.									
	201	202	203	204	205	206	207	208	209	210
Manhattan Supply Co., New York	*$0.05	*$0.06	*$0.06	*$0.11	*$0.14	.....	.....	.....	.....	.....
Easton & Rupp, Washing. D. C	.....	.....	.....	.....	.....	*$4.50	.....	*$4.10	*$2.30	*$1.80
John H. Chesley & Co., Washington, D. C	.....	.....	.....	.....	.....	5.15	*$3.68	4.12	.....	.....

Bidder.	Items.									
	211	212	213	214	215	216	217	218	219	220
Manhattan Supply Co., New York	.....	.....	.....	.....	.....	.....	$6.00	.....	.....	.....
R. Carter Ballantyne, Washington, D. C	$3.38	$4.10	$5.40	.....	$1.60	.....	*2.52	.....	.....	*$2.14
Easton & Rupp, Washington, D. C	*2.30	*3.40	*4.40	*$5.87	2.75	*$3.50	3.40	*$5.80	*$6.50	2.15
Shoemaker & Bush, Philadelphia, Pa	.....	.....	.....	.....	*1.35	3.50	.....	.....	.....	.....

* Contract awarded. † Half dozen.

Schedule of bids and statement of contracts awarded and entered into, etc.—Continued.

Bidder.	Items.									
	221	222	223	224	225	226	227	228	229	230
Wm. H. Teepe, Washington, D. C				*$0.90	*$0.40	*$0.40	*$0.13½	*$0.17½	*$0.40	
R. Carter Ballantyne, Washington, D. C	*$6.20	*$0.62	$3.60	.85						
Easton & Rupp, Washington, D. C	6.50	.75	*3.50	2.00						*$0.75

Bidder.	Items.									
	231	232	233	234	235	236	237	238	239	†240
Manhattan Supply Co., New York		$0.22						$0.90		
Remsburg & Elliott, Washington, D. C				*$0.47	*$0.40	$0.25	$0.90	1.25	*$0.44	$0.24
Wm. H. Teepe, Washington, D. C		.28	$0.15							
R. Carter Ballantyne, Washington, D. C		*.17½	*.09 .11							
Easton & Rupp, Washington, D. C	*$0.85	.18½	.10 .12							
Shoemaker & Bush, Philadelphia, Pa				.89	.75	*.06¼	*.60	1.18	‡.13½	.69
John H. Chesley & Co., Washington, D. C					.87			*.74	.45	.14

Bidder.	Items.									
	241	242	243	244	245	246	247	248	249	250
Manhattan Supply Co., New York			$0.29			*$4.80	$7.80	$13.40	$4.80	$3.60
Kohler Manufacturing Co., Baltimore, Md			*.22	$0.15	$0.15					
Remsburg & Elliott, Washington, D. C	*$0.90									
Wm. H. Teepe, Washington, D. C		*$0.50	.24	.12½	.12½					
R. Carter Ballantyne, Washington, D. C			.29¼	*.08½					3.40	*2.08
Easton & Rupp, Washington, D. C			.25	.09	*.12				*2.75	3.30
John H. Chesley & Co., Washington, D. C						5.10	*7.40	*11.80	3.35	3.30

Bidder.	Items.							
	251	252	253	254	255	256	257	258
Manhattan Supply Co., New York	*$1.24	*$1.15		$5.00	$5.00			*$2.73
Remsburg & Elliott, Washington, D. C						$4.80	$1.87	
Easton & Rupp, Washington, D. C			*$1.65	*1.80 2.40	*1.50 2.15			
Shoemaker & Bush, Philadelphia, Pa						*3.70	*a 1.59½ b. 74	
John B. Daish, Washington, D. C								2.79

* Contract awarded, † No contract awarded, ‡ No sample.

SALE OF CONDEMNED VESSELS.

Since the date of the last annual report of this Department the following-named vessels, which were condemned as unfit for further service and stricken from the Navy Register, in pursuance of section 2 of the act of August 5, 1882 (Stats. at Large, 22, p. 296), have been appraised and sold at public sale, in accordance with section 5 of the act of March 3, 1883 (Stats. at Large, 22, p. 599), viz, the tugs *Mayflower* and *Speedwell* at the navy-yard, Norfolk, Va., and the *Catalpa* at the navy-yard, New York. These vessels were sold under written proposals invited by this Department's advertisements of November 20, 1893, and June 28, 1894.

The tug *Mayflower* was first appraised at $2,500, and was offered for sale with the *Ivy* in October, 1892, but no bids were received for her at that time. The vessel was reappraised in October last at $1,045, and bids again invited by public advertisement. The only proposal received was that of Messrs. Thomas Butler & Co., of Boston, Mass., and the vessel was sold to that firm, December 27, 1893, for $1,057.50, the amount of their offer. The expense of advertising this vessel was $113.78, and the sum covered into the Treasury, under section 3618 of the Revised Statutes, as "Miscellaneous receipts on account of proceeds of public property," was $943.72.

The annexed is a copy of the account current of the sale rendered to the accounting officers of the Treasury by the Secretary of the Navy.

H. A. Herbert, Secretary of the Navy, in account current with the United States for proceeds of sale of the U. S. tug Mayflower, under public advertisement of November 20, 1893, inviting written proposals, and in pursuance of the acts of August 5, 1882, 22 Statutes, p. 296, and March 3, 1883, 22 Statutes, p. 599.

DR.

Jan. 13, 1894.	Received from—	
	Thos. Butler & Co	$1,057.50
		1,057.50

CR.

Jan. 23, 1894.	By amount—	
	Paid World, New York, No. 1	54.00
	Paid Record, Philadelphia, No. 2	45.60
	Paid Landmark, Norfolk, No. 3	14.18
	Covered into U. S. Treasury, miscellaneous receipts	943.72
		1,057.50

The honorable the Fourth Auditor of the Treasury, in a communication to the Secretary of the Navy under date of July 10, 1894, reported the account as settled and balanced.

The U. S. tug *Catalpa* having been condemned and stricken from the Navy Register January 26, 1894, that vessel, together with the tug *Speedwell*, was advertised for sale April 26, 1894. The latter vessel, appraised at $600, had previously, in 1892, been offered for sale, but no offers were then received. The *Catalpa* had been appraised at $800. The day for opening the bids, May 28, passed without any offers being received for either vessel. In view of the fact that the cost of keeping these vessels was considerable, amounting in a year to more than their appraised values, the Department decided that it would be to the interest of the Government to dispose of them as early as practicable without limiting the price to their appraised value, and accordingly recommended to the President that authority be granted under the fifth section of the act of March 3, 1883, to sell the tugs to the highest bidder or bidders regardless of whether the bids were greater or less than the appraised value of the vessels. The necessary authority having been granted, advertisement was again issued June 28, 1894, and bids opened July 23, 1894, as follows, viz:

For the *Catalpa:*	
M. H. Gregory, Great Neck, N. Y	$351
W. J. Bannerman, Brooklyn, N. Y	337
W. O. Day, New York City, N. Y	200
For the *Speedwell:*	
Oscar F. Smith, Norfolk, Va	337
Thompson C. Gill & Co., Philadelphia	305

The bids of Messrs. M. H. Gregory and Oscar F. Smith were accepted for the p chase of the *Catalpa* and *Speedwell*, respectively.

The expense of twice advertising the tugs *Catalpa* and *Speedwell* was $326.46, a the sum covered into the Treasury, under section 3618 of the Revised Statutes, "Miscellaneous receipts on account of proceeds of public property," was $361.54.

The annexed is a copy of the account current of the sales rendered to the accou ing officers of the Treasury by the Secretary.

H. A. Herbert, Secretary of the Navy, in account current with the United States for p ceeds of sale of the U. S. tugs Speedwell and Catalpa, under public advertiseme of April 26 and June 28, 1894, inviting written proposals, and in pursuance of the fi section of the act of Congress approved March 3, 1883.

DR.

July 31, 1894.	Received from—	
	M. H. Gregory, for the *Catalapa*	$351
Aug. 1, 1894.	O. F. Smith, for *Speedwell*	337
		688

CR.

Oct. 18, 1894.	By amount paid for advertising as follows:	
	The Times, New York, No. 1	79
	The Times, New York, No. 2	60
	The Marine Journal, New York, No. 3	55
	The Eagle, Brooklyn, No. 4	30
	The Eagle, Brooklyn, No. 5	22
	The Virginian, Norfolk, No. 6	19
	The Virginian, Norfolk, No. 7	14
	The World, New York, No. 8	44
	By this amount covered into the Treasury as miscellaneous receipts	361
		688

The honorable the Auditor for the Navy Department, in a communication to t Secretary of the Navy under date of November 7, 1894, reported the account as s tled and balanced.

BENJ. MICOU,
Chief Clerk

RECEIPTS FROM SALE OF GOVERNMENT PROPERTY.

Statement of deposits on account of sales of Government property, Navy Department, from November 1, 1893, to November 1, 1894.

[Compiled in office of Auditor for the Navy Department, by direction of the Secretary of the Treasury.]

Date of deposit.	Place of deposit.	By whom deposited.	Nature of property sold.	Amount covered to miscellaneous receipts.	Amount credited to the appropriation.	Total amount deposited.	Remarks.
1893.							
Nov. 18	New York, assistant treasurer.	Arthur Burtis, pay inspector.	Rent of Government property	$125.00		$125.00	
21	do	O. C. Tiffany, paymaster	Clothing sold to Revenue Marine Service.		$163.17	163.17	
27	Boston, assistant treasurer.	T. S. Thompson, paymaster.	Cost of material used in docking yacht Pilgrim.		39.92	39.92	
28	The First National Bank, Newport, R. I.	C. S. Williams, paymaster	Received from Dundee Chemical Works, on account of waste acid.	187.45		187.45	
28	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold to officers		185.71	185.71	
Dec. 6	do	do	Sale of condemned marine clothing.	287.76		287.76	
15	do	Alex. G. Morgan, disbursing agent.	Bronze castings furnished Bureau of Engraving and Printing.		16.87	16.87	
18	Boston, assistant treasurer.	T. S. Thompson, paymaster.	Sale of old torpedo shed, navy-yard, Boston.	5.50		5.50	
22	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Sale of condemned marine clothing.	8.15		8.15	
26	San Francisco, assistant treasurer.	H. T. Skelding, paymaster	Sale of condemned animals	37.50		37.50	
1894.							
Jan. 19	New York, assistant treasurer.	W. B. Wilcox, passed assistant paymaster.	Sale of old lumber	5.00		5.00	
24	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Sale of one pair of shoes	.25		.25	
26	do	Stephen Rand, paymaster	Proceeds of condemned ordnance material.		2,283.68	2,283.68	
Feb. 1	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold to officers		369.34	369.34	
8	do	Alex. G. Morgan, disbursing agent.	Iron and bronze castings furnished Bureau of Engraving and Printing.		138.61	138.61	
15	do	H. B. Lowry, quartermaster, U. S. Marine Corps.	Sale of condemned furniture	34.69		34.69	
26	do	do	Fuel sold to officers		126.00	126.00	
28	do	do	do		369.33	369.33	

Statement of deposits on account of sales of Government property, Navy Department, from November 1, 1893, to November 1, 1894—Continued.

Date of deposit.	Place of deposit.	By whom deposited.	Nature of property sold.	Amount covered to miscellaneous receipts.	Amount credited to the appropriation.	Total amount deposited.	Remarks.
1894. 26	San Francisco, assistant treasurer.	H. T. Skelding, paymaster..	Proceeds sale of condemned naval supplies.	$2,792.17	$4,561.57	$7,353.74	Clothing and small stores fund. $4,312.84 Ordnance material, act Mar. 3, 1875. 233.35 Sale of small arms.. 15.38 4,561.57
Mar. 7	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Sale of old furniture	3.95		3.95	
14	do	do	Sale of storm caps	2.45		2.45	
16	do	Alex. G. Morgan, disbursing agent.	Castings furnished Bureau of Engraving and Printing.		22.41	22.41	
26	do	Chief Bureau of Ordnance, Navy Department.	Forging plug trays for Midvale Steel Co.		14.46	14.46	
26	do	do	Cartridge bags and powder furnished the State of Virginia.		55.00	55.00	
28	do	Stephen Rand, paymaster...	Proceeds sale of condemned naval supplies.	644.09	12,912.08	13,556.17	Ordnance material, act Mar. 3, 1875. $12,912.08
29	New York, assistant treasurer.	Arthur Burtis, pay inspector	Rent of Government property	125.00		125.00	
Apr. 2	U. S. Treasury	Arthur Peterson, passed assistant paymaster.	Received from purchase of discharge.	21.60		21.60	
2	do	Geo. W. Simpson, assistant paymaster.	do	108.00		108.00	
4	do	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold to officers		331.36	331.36	
19	do	do	Sale condemned marine clothing, tents, and stores.	59.02		59.02	
24	do	H. T. B. Harris, paymaster..	Received from purchase of discharge.	35.10		35.10	
24	do	G. C. Goodloe, paymaster U. S. Marine Corps.	do	971.87		971.87	
May 4	do	Chief, Bureau Ordnance, Navy Department.	From Standard Steel Co. for remedying defects in 38-inch box slides furnished by company.		195.09	195.09	
8	Philadelphia, assistant treasurer.	A. D. Bache, pay inspector..	Rent of Government wharf property.	446.17		446.17	
10	New York, assistant treasurer.	O. C. Tiffany, paymaster	Uniforms furnished U. S. Revenue Service and Connecticut militia.		364.25	364.25	
14	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold to officers		83.25	83.25	

	29	.....do	W. McCarty Little, lieutenant.	Gain on exchange	200.00		200.00
June	2	Boston, assistant treasurer	T. S. Thompson, paymaster.	Material furnished in docking U. S. S. Enterprise.		33.25	33.25
	8	U. S. Treasury	Alex. G. Morgan, disbursing agent.	Castings furnished Bureau Engraving and Printing.		27.18	27.18
	16	New York, assistant treasurer.	O. C. Tiffany, paymaster	Clothing furnished Revenue-Marine Service.		311.87	311.87
	15	San Francisco, assistant treasurer.	H. T. Skelding, paymaster	Sale condemned material (ordnance), act March 3, 1875.		40.53	40.53
	25	U. S. Treasury	Secretary of the Navy	Sale of tug Mayflower, act March 3, 1875.	943.72		943.72
	23	The Norfolk National Bank, Norfolk, Va.	W. W. Galt, paymaster	Proceeds sale of floating-gate caisson and wooden gates of dry dock.	705.40		705.40
	23	Baltimore, assistant treasurer.	James Fulton, pay director.	Clothing issued to cadets		275.85	275.85
July	3	Philadelphia, assistant treasurer.	Arthur Peterson, paymaster.	Rent of wharf	25.00		25.00
	12	U. S. Treasury	Geo. E. Hendee, paymaster	Purchase of discharge	68.32		68.32
	13	.....do	L. A. Frailey, paymaster	.....do	28.80		28.80
	13	.....do	O. C. Tiffany, paymaster	.....do	437.40		437.40
	17	.....do	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold to officers		140.59	140.59
	17	.....do	.....do	Sale condemned clothing, furniture, and accouterments.	16.81		16.81
	18	.....do	L. C. Kerr, passed assistant paymaster.	Purchase of discharge	37.80		37.80
	19	.....do	H. E. Jewett, assistant paymaster.	.....do	79.20		79.20
	21	.....do	Geo. W. Beaman, pay inspector.	.....do	86.40		86.40
Aug.	6	New York, assistant treasurer.	T. J. Cowie, past assistant paymaster.	Sale condemned steam launch belonging to Monocacy.	63.13		63.13
	9	U. S. Treasury	Chief Bureau of Ordnance, Navy Department.	From State of Virginia, for installing a 1-pounder gun on board steamer Accomac.		12.60	12.60
	16	.....do	Alex. G. Morgan, disbursing agent.	Iron and bronze castings furnished Bureau of Engraving and Printing.		9.01	9.01
	24	.....do	Geo. E. Hendee, paymaster	Purchase of discharge	54.00		54.00
Sept.	1	.....do	G. C. Goodloe, paymaster, U. S. Marine Corps.	.....do	110.28		110.28
	4	.....do	Chief Bureau of Ordnance, Navy Department.	Received from American Steel Casting Co. for remedying defects in 5-inch slide.		6.72	6.72
	11	New York, assistant treasurer.	O. C. Tiffany, paymaster	Proceeds sale of uniform clothing to U. S. Revenue Marine.		316.59	316.59
	14	Boston, assistant treasurer.	T. S. Thompson, paymaster	Sale of condemned animals	97.75		97.75
	17	The First National Bank, Portsmouth, N. H.	W. W. Barry, paymaster	Sale of condemned oxen	165.00		165.00

Statement of deposits on account of sales of Government property, Navy Department, from November 1, 1893, to November 1, 1894—Continued.

Date of deposit.	Place of deposit.	By whom deposited.	Nature of property sold.	Amount covered to miscellaneous receipts.	Amount credited to the appropriation.	Total amount deposited.	Remarks.
1894.							
21	The Norfolk National Bank, Norfolk, Va.	W. W. Galt, paymaster	Sale of 6 oxen, ox carts, yokes, etc., condemned.	$166.35		$166.35	
18	U. S. Treasury	W. Goldsborough, paymaster.	Purchase of discharge	115.20		115.20	
Oct. 6	do	W. P. Titcomb, disbursing agent.	On account of 20 blankets		$45.40	45.40	
11	New York, assistant treasurer.	O. C. Tiffany, paymaster	Issues of Navy clothing to Revenue Marine.		278.88	278.88	
15	U. S. Treasury	Alex. G. Morgan, disbursing agent.	Brass and iron castings furnished Bureau Engraving and Printing.		79.51	79.51	
Sept 27	do	C. D. Sigsbee, commander	Proceeds sale nautical books and charts.		10.71	10.71	
Oct. 16	do	do	do		33.40	33.40	
17	Baltimore, assistant treasurer.	James Fulton, pay director	Sale of condemned boilers	132.44		132.44	
19	U. S. Treasury	H. B. Lowry, quartermaster, U. S. Marine Corps.	Fuel sold officers		117.36	117.36	
22	do	John A. Mudd, passed assistant paymaster.	Purchase of discharge	134.40		134.40	
22	do	John Corwine, paymaster	do	403.50		403.50	
17	San Francisco, assistant treasurer.	Louis Weule	Proceeds nautical books and charts.		50.00	50.00	
25	New York, assistant treasurer.	C. D. Sigsbee, commander	do		67.18	67.18	
27	U. S. Treasury	Secretary of the Navy	Sale of tugs Speedwell and Catalpa, act March 3, 1883.	361.54		361.54	
28	New Orleans, assistant treasurer.	Woodward, Wright & Co.	Proceeds nautical books and charts.		6.75	6.75	
26	New York, assistant treasurer.	R. Merrill's Sons	do		18.88	18.88	
27	Boston, assistant treasurer	S. Thaxter & Sons	do		105.90	105.90	
25	New Orleans, assistant treasurer.	Frigerio & Schully	do		23.35	23.35	
30	San Francisco, assistant treasurer.	Dillon & Co.	do		28.30	28.30	
31	New Orleans, assistant treasurer.	Widow of L. Frigerio	do		13.50	13.50	
	Grand total			10,333.16	24,285.41	34,618.57	

REPORT

OF

THE JUDGE-ADVOCATE-GENERAL OF THE NAVY.

NAVY DEPARTMENT,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, October 1, 1894.

SIR: In compliance with the Department's order of July 2 last, I have the honor to submit herewith a report of the operations of this office for the fiscal year ending June 30, 1894:

Résumé of work of the office from July 1, 1893, to June 30, 1894.

Letters received		5,187
Letters sent		8,077
General courts-martial ordered and charges and specifications preferred:		
Officers	13	
Men	86	
		99
Examining boards		125
Retiring boards		26
Courts of inquiry and boards of investigation ordered		9
Records of general courts-martial received and examined:		
Officers	17	
Men	103	
		120
Records of summary courts-martial received and examined		718
General court-martial orders prepared and issued		102

Schedule of offenses upon which charges were preferred and trials had before naval general courts-martial, as shown by the records received at this office during the past fiscal year.

Assaulting and striking another person in the service	13
Assaulting and striking superior officer	2
Attempting and threatening to strike or assault superior officer while in the execution of the duties of his office	1
Assaulting another person in the service	5
Absence from station and duty without leave	7
Attempting to strike and assault another person in the service	1
Absence without leave	2
Absence from station and duty after leave had expired	1
Conduct to the prejudice of good order and discipline, in violation of Article 22 of the Articles for the Government of the Navy (fraudulent enlistment)	19
Conduct to the prejudice of good order and discipline	13
Culpable inefficiency in the performance of duty	2
Desertion	46
Drunkenness	13
Drunkenness on post	2
Drunk on duty	1
Disrespectful in language and deportment to superior officer while in the execution of the duties of his office	3

Disobedience of the lawful order of superior officer while in the execution of the duties of his office	3
Disobeying a lawful order of the Secretary of the Navy	1
Embezzlement, in violation of Article 14 of the Articles for the Government of the Navy	1
Falsehood	1
Insubordination	2
Leaving post before being regularly relieved	4
Making a false and fraudulent official report, in violation of Article 14 of the Articles for the Government of the Navy	1
Neglect of duty	1
Negligence in obeying orders, in violation of the ninth clause of Article 8 of the Articles for the Government of the Navy	1
Resisting arrest	1
Refusing to obey the lawful order of superior officer	3
Rendering false and fraudulent return of balances to credit, in violation of Article 14 of Articles for the Government of the Navy	1
Rendering a false and fraudulent return, in violation of Article 14 of the Articles for the Government of the Navy	1
Scandalous conduct tending to the destruction of good morals	6
Sleeping while on watch	1
Sleeping on post	1
Treating with contempt superior officer and disrespectful to him in language and deportment while in the execution of the duties of his office	1
Theft	5
Through negligence suffering a vessel of the Navy to be run upon a reef and stranded	1
Using abusive, obscene, and threatening language toward another person in the service	1
Using abusive and threatening language toward superior officer	1
Using abusive and threatening language toward another person in the service	1
Using profane, obscene, and abusive language toward superior officer	2
Using provoking words and manner toward another person in the Navy	1
Using profane and abusive language toward superior officer while in the execution of the duties of his office	1
Violation of the sixth clause of the eighth Article of the Articles for the Government of the Navy (treating superior officer with contempt)	1
Violation of a lawful regulation issued by the Secretary of the Navy	1
Willful destruction of Government property	1

The advertisements, forms of proposal, and contracts for gunboats Nos. 7, 8, and 9 were drawn in this office, and likewise the contracts, eleven in number, for stationery supplies for the Navy Department and its bureaus and offices, including the Naval Observatory, for the current fiscal year, as well as the contracts for ice, washing towels, and the sale of waste paper, and in addition thereto various supplemental contracts and agreements in modification of existing contracts, and the final releases and patent guarantees required of contractors upon the completion of their contracts.

Applications for removal of the mark of desertion, for issuance of certificate of discharge in true name, fixing date of discharge, etc.

Applications received for removal of charge of desertion, etc	267
Cases in which charge has been removed	26
Cases in which application has been denied	158
Cases in which date of discharge has been determined by the Department	40
Cases in which issuance of discharge in true name has been authorized	11
Cases awaiting information from applicant	17
Cases awaiting information from other offices and bureaus	7
Letters sent in relation to desertion cases	677

ACT OF AUGUST 14, 1888.

As stated in my report for the fiscal year ending June 30, 1893, the act entitled "An act to relieve certain appointed or enlisted men of the Navy and Marine Corps from the charge of desertion," approved August

14, 1888, expired, under the limitation contained therein, five years after the date of its passage, viz, on the 14th of August, 1893. Consequently, the consideration of applications for the removal of the charge of desertion during the greater part of the year ending the 30th of June last has been restricted to such as were filed within the period of five years prescribed by the law, those cases not being barred by the limitation referred to, and such as were based upon the claim that the charge was erroneously entered or retained on the records.

The provisions of the above-mentioned act of Congress being no longer operative, there has been, as will be seen by reference to the foregoing statement, a decrease in the number of applications filed for the removal of the charge of desertion. A large percentage of the applications rejected since the expiration of the act referred to were received from the Commissioner of Pensions, who, in considering claims of enlisted men of the Navy and Marine Corps for pension, refers the cases to this Department for a determination of record of service, unless the applicant himself can show satisfactorily that he was honorably discharged from the naval service. In a majority of the cases in which applications for the removal of the charge of desertion, filed since August 14, 1893, have been rejected, the applicant's record has shown that he would have been entitled to relief if the application had been filed before said date. In disposing of such meritorious cases, applicants have been informed that Congress alone could grant the relief sought.

Congress has, in a number of cases, authorized the removal of the charge of desertion by special enactment. In these cases the necessary executive action to give effect to such special acts, in each particular instance, has been taken under the supervision of this office.

CHILEAN INDEMNITY FUND.

At the date of my last report the whole amount of the fund, $75,000, placed in the hands of the Secretary of the Navy by the Government of Chile to be paid to the seamen of the U. S. S. *Baltimore* who were injured, and to the families of the two who were killed by the mob in Valparaiso, October 16, 1891, had been distributed in accordance with the Department's instructions, with the exception of the sums of $1,000 and $300, fixed as the amounts to be paid to Joseph Quigley and William H. Nichols, respectively, which amounts were withheld by the Department because the two men named had deserted from the naval service. Since then Joseph Quigley, having surrendered himself on board the receiving ship *Independence*, at the navy-yard, Mare Island, Cal., has been tried by a naval general court-martial on the charge of desertion, found guilty of absence without leave, and sentenced, July 26, 1894, to imprisonment for six months with loss of pay except $2 a month to pay necessary prison expenses, and is now undergoing confinement accordingly in the prison at said navy-yard. It would seem to be altogether just and proper that the portion of said fund set aside for Quigley should be paid to him upon the expiration of his term of confinement, and it is recommended that the same be done. William H. Nichols is still a deserter at large.

NEW VESSELS.

In my last report a full description was given of the method pursued in regard to the securing of proposals and the making of the contracts and bonds for the construction of naval vessels from the

passage of the acts authorizing them, including a statement of the requirements inserted in the advertisements of the general provisions to be included in the contracts as set out in the forms of proposal, and of the main features of the acts of Congress relating to the construction of such vessels.

The usual provision which has appeared in all the acts since that of August 3, 1886, authorizing the building of naval vessels, that the provisions of that act as to materials, the making of the contracts, and the advertisements and proposals therefor, shall be observed and followed save that in all their parts the vessels shall be of domestic manufacture, and the restrictions laid upon the Secretary of the Navy with regard to the consideration of proposals from bidders who are not provided with sufficient plants to do the work, and the discretion allowed him in the matter of awarding the contracts to bidders or having the vessels built at the navy-yards, are omitted in the act of July 26, 1894, authorizing the construction of three torpedo boats, said last-mentioned act simply providing that the sum of $450,000 appropriated by the act of March 2, 1889, for an additional cruiser of the *Vesuvius* type shall be used for building said torpedo boats and that their cost shall not exceed that sum.

A full statement is also made in the report of last year of the method pursued in carrying out the provisions of contracts relating to the trial trips of vessels, and it is recommended that the plan adopted in the cases of the last three vessels authorized, gunboats Nos. 7, 8, and 9, of requiring the contractors to bear all expenses of all trials previous to the preliminary acceptance of vessels, be adhered to in the future. In view of the further experience obtained in connection with the settlement of bills of the expenses of preliminary trials of vessels in those cases where it is provided that such expenses shall be borne by the Government, the advisability of requiring the contractors to bear such expenses becomes more plainly apparent.

The contracts for the construction of the three vessels, gunboats Nos. 7, 8, and 9, authorized by the act of March 3, 1893, were awarded to the Newport News Ship Building and Dry Dock Company, of Newport News, Va., bearing date, the one for gunboat No. 7, January 22, and those for the other two vessels, both January 29, 1894, and the vessels are to be completed within two years from the dates of the respective contracts. The general provisions of the contracts for these vessels are similar to those in the contracts for other naval vessels as hereinbefore referred to, the only stipulation wherein there is a difference deserving of special mention being that the contractors shall bear all the expenses of all trial trips previous to preliminary acceptance, as above stated.

NATURALIZATION BY ENLISTMENT AND SERVICE IN THE U. S. NAVY.

In my previous report I invited your attention to the injustice which resulted to the enlisted force of the Navy and Marine Corps under the naturalization laws as they then stood on the statute books, and recommended that the attention of Congress be invited to the subject in order that legislation might be enacted to correct such unjust discrimination against the enlisted men in the naval service. This recommendation met with your approval, and attention having been called to the matter in your annual report to the President, a provision was included in the act entitled "An act making appropriations for the naval service

for the fiscal year ending June thirtieth, eighteen hundred and ninety-five, and for other purposes," approved July 26, 1894, as follows:

Any alien of the age of twenty-one years and upward who has enlisted or may enlist in the United States Navy or Marine Corps, and has served or may hereafter serve five consecutive years in the United States Navy or one enlistment in the United States Marine Corps, and has been or may hereafter be honorably discharged, shall be admitted to become a citizen of the United States upon his petition, without any previous declaration of his intention to become such; and the court admitting such alien shall, in addition to proof of good moral character, be satisfied by competent proof of such person's service in and honorable discharge from the United States Navy or Marine Corps.

The effect of this legislation upon the *morale* of the enlisted force can not be overestimated, and it is hoped that the time is not far distant when the records of the Department will show that the naval service is composed entirely of American citizens.

FRAUDULENT ENLISTMENT.

During the past fiscal year charges have been preferred against nineteen of the enlisted men of the Navy and Marine Corps for fraudulent enlistment, under the provisions of the act approved March 3, 1893, making such offense punishable by general court-martial. The above legislation is believed to have a beneficial effect upon the service, and its influence will be the more strongly felt as time progresses, since it can not be doubted that the presence of this enactment upon the statute books acts as a preventive to check that class of fraudulent enlistments for which hitherto no punishment was provided. It is to be regretted, however, that a number of cases have been brought to the notice of the Department which show lack of attention on the part of the recruiting officers whose duty it is to read and explain to the candidates for enlistment the provisions of the act above referred to and to satisfy themselves that the candidates understand such provisions, as is required by Navy Department General Order No. 410, dated April 12, 1893, and in consequence thereof cases have arisen in which the Department has been embarrassed as to the proper mode of procedure.

PREVIOUS TRIAL AND CONVICTION.

In accordance with the recommendation contained in my last annual report that a paragraph be inserted in the U. S. Navy Regulations, 1893, similar to article 1018, U. S. Army Regulations, 1889, providing that after a court-martial has arrived at a finding, and before sentence is awarded, the judge-advocate may introduce evidence as to previous convictions, the Department, in U. S. Navy Regulation Circular No. 12, dated July 18, 1894, amended paragraph 1 of article 1848 of the Regulations so that it reads as follows:

When the members of the court have voted upon all the charges, if the accused has been found guilty, or guilty in a less degree than charged, upon any one of them, by the number of members which the law may require in the particular case, the court may be opened to receive evidence of previous convictions. These convictions should be proved by the records of previous trials or by duly authenticated orders promulgating the same, showing the actual offenses of which the accused was convicted. The members shall next proceed to vote upon the punishment to be inflicted.

It can not be doubted that this mode of procedure, which is similar to that in vogue in the Army, will tend to prevent the repetition of breaches of discipline by old offenders in the Navy and Marine Corps.

LIMITATION OF PUNISHMENTS.

Bills have been introduced in both the Senate and House of Representatives to amend the Articles for the Government of the Navy as follows:

Whenever by any of the articles for the government of the Navy of the United States the punishment on conviction of an offense is left to the discretion of the court-martial the punishment therefor shall not, in time of peace, be in excess of a limit which the President may prescribe.

While the bills providing for this amendment were duly referred to the Committees on Naval Affairs, respectively, of the House and Senate, during the last session, neither committee has made report thereon. I earnestly renew the recommendation contained in my last annual report on this subject, as the passage of this provision will insure greater uniformity in the punishments imposed than is now possible.

PROPOSED STATUTES OF LIMITATION.

Both Houses of Congress also referred to their respective naval committees the following amendments to the Articles for the Government of the Navy:

No person shall be tried by court-martial, or otherwise punished, for any offense, except as provided in the following article, which appears to have been committed more than two years before the issuing of the order for such trial or punishment, unless by reason of having absented himself, or some other manifest impediment, he shall not have been amenable to justice within that period.

No person shall be tried by court-martial, or otherwise punished, for desertion in time of peace committed more than two years before the issuing of the order for such trial or punishment, unless he shall meanwhile have absented himself from the United States, or by reason of some other manifest impediment shall not have been amenable to justice within that period, in which case the time of his absence shall be excluded in computing the period of the limitation: *Provided*, That said limitation shall not begin until the end of the term for which said person was enlisted in the service.

No action appears to have been taken by either committee upon the above amendments. The desirability of the enactment of statutes of limitation applicable to the naval service is obvious, and I have therefore to recommend that attention be again invited to the proposed amendments above quoted with a view to securing their passage.

DEPOSITIONS.

In addition to the proposed legislation heretofore mentioned, a bill was introduced in both Houses during the second session of the present Congress providing as follows:

The depositions of witnesses stationed or residing at such a distance from the place where a naval court is held, or who are under orders and about to go to such a distance, that it is not, in the judgment of the court, practicable to secure their personal attendance without incurring unreasonable expense and loss of time, if taken on reasonable notice to the opposite party and duly authenticated, may be put in evidence before such court.

No action was taken on this bill by the committees to which it was referred. For the reasons fully set forth in my last report it is believed that such legislation would be of material value in administering justice in the naval service.

CIVILIAN WITNESSES BEFORE NAVAL COURTS.

I have the honor to renew the recommendation made in my last report that Congress be requested to take such action as may be necessary to enable naval courts-martial and courts of inquiry to summon civilian

witnesses whose testimony may be required to fully insure the administration of justice by such courts, and that the courts be also empowered to punish for contempt in case of refusal to testify.

Action of this character on the part of Congress would not only tend to prevent possible injustice to persons brought before naval courts for trial, but would also operate to prevent the commission of offenses for which, under present circumstances, offenders can not be brought to trial, on account of the inability of naval courts to secure the testimony of civilian witnesses.

NAVAL EXAMINING AND RETIRING BOARDS.

In my last report I invited attention to the cumbersome provisions governing the procedure of naval examining and retiring boards, caused by the disconnected manner in which legislation on this head has been enacted, and recommended that Congress be asked to place the question of the procedure of these boards on a footing of greater simplicity and efficiency by the adoption of methods similar to those now in vogue in the Army and Marine Corps. The experience of the past year confirms the views then expressed. In view of the importance of this matter I respectfully renew my recommendation on the subject and earnestly ask your consideration thereof.

An anomalous feature of the present system is that passed assistant surgeons are not examined upon their promotion to the grade of surgeon, nor are chief engineers and passed assistant engineers examined upon advancement to higher relative rank in those grades. It is respectfully urged that the requirements respecting the examination of officers as to their physical, mental, moral, and professional qualifications for promotion should be made applicable to all grades of all corps in the Navy. It is not the purpose of this recommendation to suggest the institution in practice of a system of examinations scholastic in character in the case of officers in the higher grades of the service; but it is believed that a physical examination of such officers is particularly necessary, and the scope of the inquiries made by the examining board with respect to moral and professional fitness is discretionary with the board, and may very properly be confined to a careful scrutiny of the past record of such officers.

CHECKAGE OF OFFICERS' PAY.

Under a recent decision of the accounting officers of the Treasury, checkages are made against the pay of officers who are, by order of the Department, assigned to temporary duty on shore as members of courts, boards, etc., without being detached from the ships on which they are serving. Such orders to temporary duty invariably entail additional expense to the officers concerned, and it is considered unjust that they should not only be compelled to bear such additional expense, but that their pay should also be checked. Your attention having been invited to this matter, you submitted to Congress during its recent session the draft of a proposed amendment on the subject, which was incorporated in the naval appropriation bill then under consideration in the House of Representatives, but was rejected by the Senate and the conference committee. As it is a mere act of justice to officers ordered to such duty, I respectfully recommend that the subject be again brought to the attention of Congress with a request for favorable action.

CERTIFIED CHECKS IN LIEU OF BONDS.

Bills have also been introduced and referred to the committees on naval affairs in the Senate and House of Representatives, providing for the amendment of section 3719, Revised Statutes, as follows:

That section thirty-seven hundred and nineteen of the Revised Statutes be, and the same is hereby, amended by adding thereto the following: "*Provided*, That the Secretary of the Navy may, in his discretion, accept, in lieu of the written guaranty required to accompany a proposal for naval supplies, and in lieu of the bond required for the faithful performance of a contract for furnishing such supplies, a certified check, payable to the order of the Secretary of the Navy, for the full amount of such proposal or contract, the check to be held by the Secretary of the Navy until the requirements of the proposal or contract shall be complied with and as a guaranty for compliance with the same."

No report from either committee has, however, been made on the subject. I again urge the importance of this proposed amendment, for the reasons mentioned in my last report, and because of the further consideration that its passage will bar a class of irresponsible bidders whose failures to carry out the terms of their proposals cause frequent annoyance, delay, and loss to the Government.

CHANGES IN CONTRACTS.

I take pleasure in reporting that during the past fiscal year the number of changes in the plans and specifications of vessels built under contract has materially decreased.

AUTHORIZING CERTAIN OFFICERS OF THE NAVY TO ADMINSTER OATHS.

The following bill was favorably reported to the Senate and House of Representatives by the respective committees on naval affairs:

That judges-advocate of naval general courts-martial and courts of inquiry, and all commanders-in-chief of naval squadrons, commandants of navy-yards and stations, and officers commanding vessels of the Navy, be, and the same are hereby, authorized to administer oaths for the purposes of naval justice and for other purposes of naval administration.

This bill was passed by the House of Representatives May 2, 1894, but is still on the Calendar of the Senate. I respectfully urge that favorable action thereon be recommended, as its enactment will tend to expedite the business of the Department and at the same time result in the saving of a considerable amount annually in notarial bills.

At the request of the Colonel Commandant of the Marine Corps the Department addressed a communication to the chairman of the Committee on Naval Affairs of the Senate requesting that the above bill be amended so as to include the adjutant and inspector, commanding officers, and recruiting officers of the Marine Corps. Inasmuch as the bill, though it passed the House, was not reached in the Senate, the opportunity to present this amendment to the consideration of that body did not arise.

LIVE-OAK TIMBER RESERVATIONS.

By successive executive orders, issued from time to time from October 23, 1830, to November 30, 1858, a number of tracts of land in the States of Florida, Alabama, and Mississippi were reserved from the public domain for the use of the Navy Department as a source of supply of

live-oak timber. The Department is advised that much of the timber originally growing upon the reservations in the States named has been removed by trespassers or injured by forest fires, and that very little timber of any kind which could be utilized in naval construction is now to be found upon the reservations. Irrespective, however, of the value of any timber which may remain upon these reserved lands, such radical changes in naval construction have taken place since the last of the executive orders above mentioned was issued that neither live oak nor timber of any kind can longer be regarded as a material of such importance for use in naval construction as to warrant the maintenance of extensive reservations for its growth and protection. The continuance of these tracts in a state of reservation would therefore appear to serve no useful purpose, present or prospective, the public considerations which prompted their establishment having ceased to exist in consequence of the general adoption of metal in place of wood in the construction of vessels of war. It would seem entirely proper that these timber reservations be now restored to the public domain, and the recommendation contained in my last annual report that such action be taken is respectfully renewed.

SITE FOR DRY DOCK AT ALGIERS.

By a clause contained in the naval appropriation act for the fiscal year ending June 30, 1889, Congress made provision for the appointment of a commission to report as to the most desirable location, on or near the coast of the Gulf of Mexico and the South Atlantic coast, for navy-yards and dry docks. As the result of the inquiries made by the commission appointed in pursuance of this provision, the naval reservation at Algiers, La., was selected as a suitable location for a dry dock, and it having been determined, after careful surveys, borings, and soundings made under the direction of this Department, that the naval reservation at that place was not sufficiently large to afford a proper site for the proposed dry dock, and that an additional river frontage amounting to at least 4 arpents must be secured, negotiations for the purchase of such additional lands were entered into. After correspondence with representatives of the owners of adjacent property, it was ascertained that a width of 3 arpents front by a depth of 15 arpents, lying west of and adjacent to the reservation, could be purchased for the sum of $60,000, and that a width of 1 arpent front by a depth of 15 arpents, lying adjacent to and east of the reservation, could be purchased for $20,000.

The representatives of the Olivier and Trepagnier estates, owners of these properties, having declined to offer more favorable terms, and the Department deeming the price named to be excessive, proceedings for the condemnation of the tracts were instituted. As the result of such proceedings, the court awarded to the owners of the Olivier tract the sum of $37,000 and to the owners of the Trepagnier tract the sum of $7,750, with costs and interest at the rate of 5 per cent from date of decree. The appropriations made by Congress for the purchase of these lands, contained in the naval acts approved March 3, 1893, and July 26, 1894, were, however, insufficient to provide for the payment of interest. Under these circumstances the Department addressed a communication to the representatives of the owners of the lands asking whether or not they were willing to accept the principal sums named by the court and execute an unconditional conveyance of the property to the United States upon the payment thereof, leaving to the future consideration of

Congress the question as to the allowance of any claims which they might have for interest.

The parties having expressed their willingness to accept this proposition, forms of conveyance were duly prepared in this office and approved by the Honorable the Attorney-General. It is expected that the transaction will be concluded without further delay by the purchase, in pursuance of the decree of the court, of the Olivier property above mentioned for the sum of $37,000, and the Trepagnier property for the sum of $7,750.

SALE OF NAVY-YARD LANDS, BROOKLYN, N. Y.

The sale to the city of Brooklyn, N. Y., "for market purposes, for slips, canals, and piers, and other public works in connection with such market purposes," of a portion of the land included within the limits of the Brooklyn navy-yard, in pursuance of the act of Congress approved December 22, 1892, was duly completed, and a deed therefor delivered to the city June 9, 1894. The price paid, as determined by a board of appraisers appointed in January, 1893, was $1,208,666. The act provided that, after deducting the expenses of surveys, appraisal, and conveyance, the net amount received should be paid into the Treasury of the United States. The surveys having been made by the civil engineering department at the navy-yard, New York, and the deed of transfer having been drawn in this office, no expenses of surveys or conveyance were incurred, with the exception of the U. S. commissioner's fee of $5. The net proceeds of the sale were $1,190,531, which sum was deposited in the Treasury and the receipt thereof duly acknowledged under date of June 20, 1893.

By provision contained in the act making appropriations for the naval service for the year ending June 30, 1894, approved March 3, 1893, Congress appropriated the sum of $300,000 to be paid from the proceeds of the sale above mentioned "for completing gateway on Sands street, paving and grading streets in connection with same, extension of railroad tracks, continuation of quay wall, repairs to buildings, and for other improvements at the navy-yard, Brooklyn, New York."

COALING STATION IN PAGO PAGO HARBOR.

By an act approved March 2, 1889 (25 Stats., p. 814), Congress appropriated the sum of $100,000 for the purpose of permanently establishing a station for coal and other supplies for the naval and commercial marine of the United States on the shores of the bay of Pago Pago, Samoa, in pursuance of the rights acquired by the treaty of 1878. In carrying out the purpose of Congress as indicated by this act, the Department directed a careful survey to be made of the bay of Pago Pago, and as the result of such survey a tract containing about 121 acres, situated on the south shore of the bay, near the village of Pago Pago, was selected for the proposed naval station. It was found upon examination that this tract included within its limits a number of the small holdings into which lands in the Samoan Islands are divided. These small tracts, irregular in size and shape, are designated by distinctive Samoan names and are owned by families, not by individuals. The questions of title naturally arising in consequence of this peculiar tenure were further complicated by the fact that a number of foreign claims to all or a portion of the lands included within the site were

advanced. These foreign claims, resting upon alleged early purchases from representatives of native families, were in some cases conflicting and occasionally obscure as to their extent and boundaries. After a careful consideration of the subject, and in pursuance of investigations made, in consultation with the U. S. consul-general at Apia, by an officer of the Navy detailed for that duty by this Department, the following tracts and claims were purchased, at the prices stated:

(1) Goat Island, area 1 rod 4 perches; purchased from natives January 16, 1891, for the sum of $214.29.

(2) Swimming Point, area 1 rod 6 perches; purchased from natives March 31, 1891, for the sum of $200.

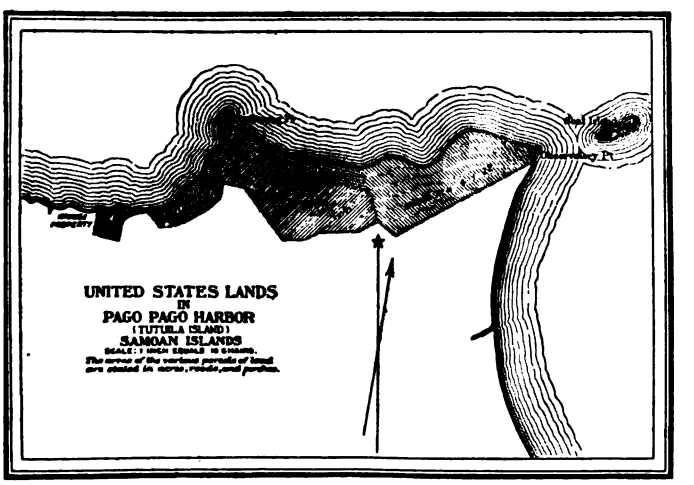
(3) Sogelau, area 1 acre 1 rod 24 perches, and Mauga Alii, area 6 acres 1 rod 22 perches; purchased from William Cooper August 27, 1891, for the sum of $1,000.

(4) Claim of the Wellman estate, purchased from executors April 18, 1892, for the sum of $977.50. This purchase includes all interest of the Wellman estate in lands lying within the site selected by Rear-Admiral Kimberly.

(5) The Sherwood claim to all lands within the site, purchased from Harris and others June 18, 1892, for the sum of $1,750.

(6) Property formerly leased for deposit of coal, purchased from P. H. Krause July 19, 1892, for $1,100.

The location and area of the several tracts of land on the bay of Pago Pago, now the property of the United States, are clearly shown upon the following plat of survey furnished by Thomas Maben, surveyor to the Samoan land commission:



The general act "by and between the United States of America, the Empire of Germany, and the United Kingdom of Great Britain and Ireland, providing for the neutrality and autonomous government of the Samoan Islands," concluded at Berlin June 14, 1889 (26 Stats., p. 1497), authorized the appointment of a land commission charged with the duty of examining and reporting upon all claims to lands in the islands, together with the evidence affecting their validity. The original deeds to the several tracts purchased by the United States as above stated were duly submitted to the land commission, in order that the titles therein conveyed might be reported for confirmation to the Supreme Court created by the same general act.

This Department is advised, through the Department of State, that under date of March 2, 1894, the land commission submitted a special

report upon the several claims in which the United States is interested, from which report it appears that this Government has acquired a valid title to all of the lands covered by its several purchases. These tracts are designated by the native names of Goat Island, Swimming Point, Sogelau, Fagaone, Lefaga Faga, and Mauga Alii. In addition the United States purchased in 1892 from Mr. P. H. Krause the tract upon which, after the treaty of 1878, coal sheds were originally placed. This tract is isolated from the main body of the lands. If it should be deemed desirable that this tract be connected with the remainder of the site, and that possession of the bluffs immediately back of the lands already obtained be also secured, the additional purchases necessary for that purpose may doubtless be made at any time. It is understood that such lands are in native ownership; that in consequence of provisions contained in the general act above mentioned they can not pass into the hands of private claimants, and that it will not be difficult to procure such additional lands at a reasonable price.

NAVAL PRISON, BOSTON, MASS.

Under date of May 19, 1894, I visited the prison at the navy-yard, Boston, Mass., for the purpose of inspecting the same. Every facility was given me by the commandant of the yard and the marine officer in charge for making my inspection thorough and for conversing unhampered with the prisoners. I found the prison and its surroundings to be in an excellent state so far as cleanliness is concerned; the prisoners, though naturally chafing under the restrictions necessarily incident to prison discipline, without just cause of complaint; and the food, all things considered, good in quality and certainly ample in quantity. I partook of the Saturday dinner and found it to be well prepared and properly served. Indeed, my only fear is lest the food be too bountiful and good for men who are necessarily, under existing circumstances, deprived of active exercise. The capacity of the prison, 40, with but one in each cell (which should not be exceeded), is insufficient, but it is believed that with the addition now being made under the direction of the Bureau of Yards and Docks, adapting the second floor of the building in which the prison is located to the accommodation of prisoners, the space will be so increased as to be quite sufficient until an appropriation shall be made by Congress for the erection of a building specially adapted to the purpose. The advantage to be gained by doing away, except in cases of emergency, with the interior cells, 14 in number, which are insufficiently lighted and ventilated, can not be overestimated.

NAVAL PRISON, MARE ISLAND, CAL.

On account of the distance, I have not visited the prison at the navy-yard, Mare Island, Cal. (capacity, 24); but from a report made thereon by the marine officer in charge and forwarded by the commandant of the yard, there is every reason to believe that it is in equally as good a state of cleanliness and discipline as that at the navy-yard, Boston, and that the fare furnished to the prisoners is quite as good.

MITIGATION OF SENTENCES FOR GOOD CONDUCT.

The plan of remitting one-fourth of the terms of confinement of prisoners whose conduct has been reported uniformly as "good" and

one-third in cases where their conduct has been reported to be "very good" or "excellent" has been systematically followed during the past year, and, though liberal, is believed to work well. Under this rule 51 prisoners have been liberated from the Boston prison before the termination of their sentences. and 8 from the prison at Mare Island.

EMPLOYMENT OF PRISONERS.

Under the sentences of prisoners now in confinement, generally no labor being provided for therein, it is not lawful to employ them at labor, but in a number of instances prisoners tried on the Pacific coast have been sentenced, in addition to confinement, to perform extra police duties, and prisoners so sentenced are employed in policing the grounds about the prison and barracks.

In his report, dated June 5 last, on the prison, Maj. Percival C. Pope, U. S. Marine Corps, says:

> The prisoners go to work at 8 a. m., stop at 11:15 a. m., resume work at 1 p. m., and stop at 4 p. m. On Saturday afternoons, Sundays, and holidays the prisoners do not work. A fact to be observed is that prisoners not sentenced to labor always request permission to work, as beneficial to health.

From his experience in charge of the prison at the navy-yard, Boston, Mass., before going to his present post, Maj. Pope is well qualified to speak in this matter, and after consulting the present commandant of the navy-yard, Boston, in regard to the employment of prisoners, I have no hesitancy in earnestly commending to the Department the propriety of issuing a general order advising naval courts that where sentences involving terms of confinement are imposed, it will be beneficial to the health of prisoners, and helpful to discipline, if the performance of extra police duties be included in such sentences as an added requirement.

"DISCHARGE FROM SERVICE WITH BAD CONDUCT DISCHARGE" IN CASE OF CONTINUOUS-SERVICE MEN.

Under date of May 15, 1893, the Department issued a general order (No. 413) calling the attention of commanding officers and of all officers liable to duty as members of summary courts-martial to the frequency with which the punishment "discharge from the service with bad-conduct discharge" is inflicted by such courts, stating that such punishment is deemed appropriate only to cases in which the offense committed demonstrates the fact that the accused is an unfit person to remain in the naval service, and giving its opinion that said sentence should not be awarded to continuous-service men except in extreme cases, and then only after careful inquiry as to the record and length of service of the accused. The good effect of this order has been plainly demonstrated during the past year, the number of enlisted men discharged with bad-conduct discharge being small as compared with the number so discharged in previous years, and being restricted to men deemed to be incorrigible, and whose cases, therefore, are not properly met by disciplinary punishments. It is believed that great care should be exercised by summary courts-martial in inflicting this punishment, "discharge from the service with bad-conduct discharge," and that it should be imposed upon men who have been some years in the service in extreme cases only.

CLERICAL FORCE.

In transmitting herewith a copy of the estimates of appropriations required for this office for the fiscal year ending June 30, 1896, I am compelled to state that the clerical force of this office is not fully adequate to meet the demands of current business. The work of the office has been steadily increasing for several years, but no corresponding increase has been made in its clerical force. As a consequence, the prompt dispatch of business can be attained only by the most constant, zealous, unremitting, and, I regret to say, sometimes hurried work on the part of every person employed in the office; and whenever, by reason of illness or absence from duty for any cause on the part of a single member of the force, such service is not rendered, or when, as occasionally happens, additional and unusual work must be done, the current business of the office is necessarily interrupted and delayed. It is perhaps too much to hope that in practice the clerical force of any office will, uniformly and at all times, be able to work up to its highest capacity, without sickness, failure, or default of any kind; nor is it a wise economy to require that work calling for great care and attention be done hastily or under pressure. After careful consideration of the subject, I am constrained to the belief that the prompt, economical, and efficient dispatch of the business intrusted to this office requires that its clerical force be strengthened by the addition of at least one clerk of sufficient ability to undertake duties of general correspondence and the preparation of decisions. An additional copyist is also urgently needed.

Very respectfully,

SAM. C. LEMLY,
Judge-Advocate-General.

The SECRETARY OF THE NAVY.

REPORT

OF THE

SUPERINTENDENT OF NAVAL WAR RECORDS.

NAVY DEPARTMENT,
LIBRARY AND NAVAL WAR RECORDS,
Washington, D. C., September 22, 1894.

SIR: I have the honor to transmit herewith estimates for the Navy Department Library, and for the office of Naval War Records, for the fiscal year 1895–'96, marked respectively A, B, and C.

Since my last annual report there have been added to the library 1,000 volumes. Congress appropriated for professional books and periodicals for the present fiscal year $500. It is recommended that the estimate for this purpose be restored to $1,000, the original figure, which has been appropriated for many years past, this amount being necessary to keep up the present high professional standard of the library, as well as to supply the naval intelligence office with technical and professional information.

The work of collecting and preparing for publication the naval records of the civil war has been continued during the past year, and valuable additional material has been obtained. We have added to our supply of documents of the Union naval commanders the papers of Dahlgren, T. H. Stevens, and T. T. Craven, making this collection very voluminous and fairly complete. There is still, however, valuable missing material, some of which we hope to obtain.

The Confederate papers are much more difficult to find, although we have been fortunate enough this year to secure among others those of Semmes, North, Bullock, Slidell, W. W. Hunter, and Catesby ap R. Jones. We are still vigorously continuing the search for Confederate material throughout the country.

Under authority of an act of Congress approved July 31, 1894, making a small appropriation for commencing the publication of the Naval War Records, two volumes have been prepared upon a plan of publication approved by you. The first of these is already in the hands of the Public Printer, and the second volume will soon follow. It is hoped to issue both these volumes during the present fiscal year.

Estimates are herewith submitted for the continuation of the publication of this work, an item of $25,000 being presented to defray the estimated cost of three additional volumes, which will be ready for the press during the next fiscal year.

Very respectfully,

RICHARD RUSH,
Superintendent Naval War Records.

The SECRETARY OF THE NAVY.

OPERATIONS OF THE NAVAL MILITIA.

NAVY DEPARTMENT,
OFFICE ASSISTANT SECRETARY,
Washington, October 16, 1894.

SIR: I have the honor to inclose herewith the report of the operations of the naval militia during the past year, and to call your especial attention thereto.

Very respectfully,

W. MCADOO,
Assistant Secretary.

The SECRETARY OF THE NAVY.

OCTOBER 4, 1894.

SIR: I have the honor to make the following report on the naval militia of the various States for the currrent year:

The usual annual appropriation of $25,000 was allotted to the States in accordance with the regulations established by the Secretary of the Navy, dated January 26, 1894. In former years the distribution of the appropriation was made in the month of October. It was delayed this year in order to allow the States which had lately passed naval militia laws time to organize their forces and make reports to the Department.

In compliance with these regulations returns were received from the governors of the following-named States, viz:

Name of State.	Total of officers and men.
Massachusetts	448
Rhode Island	113
Connecticut	65
New York	432
Pennsylvania	217
Maryland	128
North Carolina	168
South Carolina	208
California	320
Illinois	367
Michigan	73
Total	2,539

Since the date of the last annual report, Michigan and Connecticut have organized naval militia divisions in Detroit and New Haven respectively. The legislatures of Vermont, New Jersey, Virginia, and Georgia have passed laws authorizing the formation of naval militia battalions, but as yet no officers or men have been mustered in there-

under. Efforts are to be made in Ohio and Washington to pass such laws at the next sessions of the legislatures. A bill was introduced in Congress during its last session having in view the organization of a naval militia battalion in the District of Columbia.

Three national appropriations for naval militia of $25,000 each have now been allotted to the various States having organized naval forces. Under regulations prescribed by the Secretary of the Navy this distribution has been made so that each State received a proportionate part of the sum of $25,000 according to the proportion which the number of officers and men or (as in the last regulations) the number of petty officers and men returned from each State bore to the total number returned by all the States.

The following table contains, for the different years, the amounts of such allotments, and not only shows how the States which first organized their naval militia have naturally received the greatest benefits from the appropriation, but also clearly indicates that they will continue to receive disproportionate benefits from the national Treasury, as compared with the newly organized militia, unless the rule so far followed is changed.

State.	Fiscal year—			Total.
	1891-'92.	1892-'93.	1893-'94.	
Massachusetts	$5,123.93	$5,190.75	$4,249.36	$14,564.04
Rhode Island	1,178.16	871.70	1,164.80	3,214.66
Connecticut			657.90	657.90
New York	7,461.71	6,366.78	4,346.42	18,174.91
Pennsylvania			2,113.87	2,113.87
Maryland		1,382.39	1,315.79	2,698.18
North Carolina	2,203.60	3,572.74	1,650.13	7,426.47
South Carolina		2,318.84	2,006.04	4,324.88
California	8,094.43	5,296.80	3,203.19	16,594.42
Illinois			3,548.32	3,548.32
Michigan			744.18	744.18
Texas	938.17			938.17

No returns have been received from Texas since 1891.

The object of the national appropriation is to arm and equip the naval militia. Under the present regulations it is impossible to promptly and properly arm and equip newly organized forces, especially when they are small, as is usual in the beginning of such organizations. So far the regulations have, generally speaking, worked well, but as it is expected that during the current fiscal year several new divisions will be organized, it is recommended that the appropriation be so distributed that the newly organized forces receive a proportionately larger amount than those of the States which have for three years received large allotments and whose militia is practically armed and equipped in the meaning of the law. As a general rule only sufficient money should be allotted to these States to enable them to purchase ammunition for target practice, and to replace such arms and equipments as may be worn out or injured in service.

Michigan, Pennsylvania, and Connecticut, especially, should for the present receive larger appropriations in order that these States may complete their equipment and increase their personnel. Such a course would also serve as encouragement to prospective organizations in other States.

Of course little can be done by the National Government, especially in the beginning of the organization in a State, unless State or municipal aid is extended in the matter of uniforms and quarters.

As a conspicuous example of energy and enterprise shown in this direction, I think it proper to mention Connecticut, which State, soon after the naval militia law was enacted, promptly organized a division in New Haven and purchased arms and uniforms for the force.

Another need, almost a necessity, for the successful conduct of the naval militia movement in any State, is the attachment to the force of an ex-naval officer, one who is thoroughly familiar with the customs and regulations of the Navy, and with the manner of conducting the drills of the service.

Under the act to promote the efficiency of the naval militia, approved August 3, 1894, the Department is enabled to loan such vessels, boats, and ship equipments as are not required for the general service to the governors of States having an organized naval militia.

Under this act the following-named vessels either have been or are about to be loaned, viz: The *New Hampshire* to New York, the *St. Louis* to Pennsylvania, the *Wgandotte* to Maryland, the *Nantucket* to North Carolina, and the *Swatara* to California.

Steps are being taken to loan ships' cutters to the Michigan militia at Detroit, the two separate divisions at Rochester, the division at New Haven, Conn., and to the various divisions of South Carolina at Charleston and Port Royal. This will enable these divisions to get boat practice and to become familiar, through boat expeditions, with the coasts and harbors of their States.

Pursuant to the intention expressed by the Secretary of the Navy in his last annual report, opportunities for a short cruise in a man-of-war were again granted during the past summer to the naval militia of such States as desired to give the officers and enlisted men of their forces these necessary and highly instructive object lessons relating to their important duties as a sea force.

Massachusetts encamped her brigade on Lovell's Island, Boston Harbor. During the continuance of the encampment the monitor *Passaic* was loaned to this State, and drills and target practice were had on board the *Miantonomoh* and *Atlanta*. The two divisions of Rhode Island drilled on board the *Miantonomoh*.

Connecticut's force received instruction while cruising in the *Atlanta* in Long Island Sound.

New York's battalion and the two separate divisions from Rochester spent an instructive week on board the *New York* and *San Francisco*, in Gardiner's Bay, Long Island.

Pennsylvania's naval militia from Philadelphia and Pittsburg was quartered in the *New York* for a few days' sea practice.

The *Montgomery* was sent to Southport, N. C., for the purpose of giving the North Carolina battalion an opportunity to drill on board a modern war vessel. The battalion itself manned the *Nantucket* at Wilmington, which vessel proceeded under her own steam to Southport, the rendezvous for the summer's drills and exercises.

Maryland's force, having been only lately organized in Baltimore, was not prepared to fully benefit by instruction on board a man-of-war, and was therefore not embarked.

South Carolina did not accept the Department's offer of the loan of a vessel for the purpose of exercising and drilling its naval militia.

No vessels have so far been available for the California militia. It was intended to give the divisions of Illinois and Michigan a week each on board the *Michigan*, but this vessel has been engaged in surveying duties and has so far not been available for the naval militia.

The valuable reports on the various militia organizations, prepared by boards of officers detailed for the purpose on board the ships in which the exercises were conducted, are appended and will undoubtedly be read with great interest by all who are concerned in this comparatively new effort to organize an efficient reserve for the Navy of our country.

The consensus of opinion gathered from these reports seems to be that the naval militia may prove a useful adjunct to the Navy in time of war as a reserve for coast defense.

The opinion of Rear-Admiral Meade, commanding the North Atlantic station, expressed in his indorsement on the Pennsylvania report, is that the naval militia is an important school for the training of a reserve force of officers for the Navy, and in this respect the admiral compares its probable usefulness in time of war to the service rendered by the Seventh Regiment of the New York Militia in supplying officers to the Army during the civil war.

Various details, such especially as relate to uniform and messing arrangements, have been omitted in the copies of the annexed reports as not being of general interest. The data showing the various professions, trades, and employments of the men composing the militia are, however, given, and I beg to call special attention to these, as it seems to me that upon such information any opinion as to the probable field to be occupied by the naval militia in time of war must be largely based.

Giving due weight to these reports, there seems still to be a want of certainty as to the probable duties of the naval militia on the outbreak of war, which doubt and uncertainty is forcibly stated by Commander C. H. Davis, in his indorsement of the report of the officers of the *Montgomery* on the North Carolina battalion, as well as by the board which made the report on the Massachusetts brigade.

I would therefore suggest that steps be taken to call together the principal officers of the naval militia for consultation on this subject. Invitations should be sent to the authorities of the various States asking them to participate in this initial movement toward suggesting positive legislation regarding the duties of the naval militia and its relation to the National Government and its naval forces.

In the meantime, in view of the opinion expressed by the naval officers who have made this year's reports as to the militia's probable usefulness as a force for coast defense, I venture to recommend that a series of drills in the monitors be arranged for with the governors of the States concerned, the engagements to be made, if possible, early in the spring, and the exercises to be carried out systematically during the next summer, at which time it is believed two or more monitors on this coast, and the *Monterey* on the Pacific, may be available for this important duty.

Very respectfully,

W. H. SCHUETZE,
Lieutenant, U. S. Navy.

The ASSISTANT SECRETARY OF THE NAVY.

MASSACHUSETTS.

U. S. S. ATLANTA, SECOND RATE,
Boston, Mass., July 30, 1894.

SIR: In compliance with your order of the 22d instant, we have the honor to submit the following report upon the officers and men of the naval brigade of the State of Massachusetts.

Previously to going into camp at Lovells Island the U. S. S. *Passaic* was turned over to the naval brigade, was anchored for one month in Boston harbor and manned by the Boston Battalion, each company taking one week in turn. The men were on board from 5 p. m. to 8 a. m., keeping the ship in order and drilling, and going to their regular employments during the day. During this time the ship was put in very good order and condition, and was scraped and painted in dry dock by Company D. As this was in addition to that regularly called for by the State, and was entirely voluntary on the part of the battalion, it shows a most commendable zeal and interest in their work.

The Naval Brigade, consisting of 50 officers and 333 men, went into camp on Lovell's Island July 24, in the outer harbor of Boston. On the same day the U. S. S. *Miantonomoh*, *Atlanta*, and *Passaic* anchored to the northward and westward of Georges Island, and distant about one-half mile from the encampment. The tents were pitched under the supervision of the adjutant-general of the State before the arrival of the brigade.

Whilst the *Atlanta* and *Miantonomoh* were at anchor off the camp, portions of the Naval Brigade were drilled at the broadside guns on the 24th, 25th, and 26th. A drill in naval tactics took place on the afternoon of July 25, fourteen boats being manned by the brigade and exercised by the brigade commander.

On the 27th portions of the brigade were detailed for the *Atlanta* and *Miantonomoh* and taken to sea for target practice, returning to the camp at 4 p. m. On board the *Atlanta* 2 shots were allowed from each broadside gun, and 5 from each gun of the secondary battery.. On board the *Miantonomoh* 4 shots from the 10-inch guns were fired, and 60 from the secondary battery. One of the 10-inch shells exploded prematurely. The practice with the secondary battery and 10-inch guns was very good. The broadside guns of the *Atlanta* were largely manned by men who had not received any instruction on the previous days and were not, therefore, as good as might otherwise have been the case.

ORGANIZATION.

The unit is a gun's crew of about 12 men, 4 of which constitute a company or division. The force is mustered under the militia law of the State of Massachusetts and consists of a 2-battalion brigade of 4 companies each, organized as follows:

Naval brigade.—Captain, commander, adjutant, rank lieutenant, ordnance officer, rank lieutenant, equipment officer, rank lieutenant, paymaster, rank lieutenant, surgeon, rank lieutenant, engineer, rank lieutenant, signal officer, rank lieutenant, two aids, rank lieutenant (junior grade.)

Petty officers: Master-at-arms, chief gunner's mate, equipment yeoman, paymaster's yeoman, apothecary, armorer, 2 torpedo electricians, 4 machinists, chief quartermaster, cockswain, chief bugler.

Naval battalion.—Lieutenant-commander, adjutant, rank lieutenant (junior grade), assistant surgeon, rank lieutenant (junior grade).

Petty officers: Chief boatswain's mate, paymaster's yeoman, apothecary, electrician, chief quartermaster, bugler.

Company of naval brigade.—Lieutenant, 2 lieutenants (junior grade), 2 ensigns, 2 boatswain's mates, 2 gunner's mates, 2 quartermasters, 2 cockswains, bugler, 44 seamen; and the minimum number of enlisted shall be 41.

COMMISSARY DEPARTMENT.

Total number of officers, men, band, servants, 441.

All hands take their meals at one time in a large mess tent which has 20 tables.

The executive officer of the brigade has charge of the commissary department. The commissary sergeant or paymaster's yeoman (who is a caterer by profession) purchases daily all the food in Boston, has it sent down by steamer to the camp; the steamer costs $10 per day.

There is a force of 30 men, including cooks, waiters, and scullery men, under the commissary, who are paid on an average $2 per day. These men do not belong to the brigade.

The cost of food, transportation, pay of cooks, etc., is added up at the end of the encampment and divided pro rata; it is expected that the actual cost to each person will be *about 60 cents per day.*

The mess organization is somewhat of an experiment, departing from the plan commonly followed by militia organizations of having all meals served by a contractor.

As the chief use of an encampment is to give actual practice to a military command under service conditions, the plan adopted by the naval brigade commends itself as a step in the right direction.

DRILLS.

The board is of the opinion that the force is sufficiently proficient in infantry and handling boats; for enlisted men they are of a high order of intelligence and would, with a small amount of practice, be capable of working the battery of any of our ships of war. It does not appear that the force has been exercised in seamanship on board ship, or in handling ship, except to a very limited extent on board the *Passaic*. The rule is to have one compulsory drill per week throughout the year at the armory, supplemented frequently by boat drills, lectures and evening employments at which attendance is optional. Ninety-seven per cent of the brigade have qualified as marksmen in the State competitions.

UNIFORM.

The uniform regulations prescribed by the State are hereto appended. The brigade appears to be properly provided.

The uniform of the officers appears to be serviceable and tasteful, with the exception of the cap, which is uncomfortable and susceptible of improvement.

The full dress of the men differs from naval practice, but is neat in appearance. The cap, being identical in shape with that used by the officers, is open to the same objection. The regulations neither prescribe nor require underclothing, and it was noted that many men in the encampment wore none. We understand that there was some complaint made that the men became footsore from wearing tennis shoes.

EFFICIENCY AS SEAMEN.

The instruction which the different companies have received has been confined to a few points. In infantry and artillery drill and in handling boats under oars the men appear to be well skilled. In broadside drill of great guns they showed intelligence and quickness, and with more experience would handle a ship's battery effectively. In nearly all of the details of practical seamanship, however, they are, as a rule, without any experience other than that obtainable from yachting and boating.

The engineer's force, consisting of 1 chief engineer, rank of lieutenant; 4 machinists, and 8 firemen, is an efficient body of men. They put the engines of the *Passaic* in good order, got up steam, steamed down to the anchorage off Georges Island, and returned with the ship to the navy-yard.

CLASS OF MEN.

The enlisted men impressed the board most favorably by their general intelligence, zeal, and good behavior.

The occupations of the men differ widely in the various companies. The four Boston companies are principally clerks, although one of them contains the engineer's force already alluded to. The Lynn company is principally mechanics, containing a number of electricians and skilled workmen. The New Bedford company is said to have all its men well skilled in boating and yachting. The officers are well educated and appear qualified to attend to the instruction of their companies. Some of them are graduates of the Naval Academy, many of the colleges and technical schools. The diversity of attainments in the brigade is so great that it bids fair to soon furnish from its organization officers and men who are specialists in each branch of the naval profession.

PROFESSIONAL KNOWLEDGE.

The professional knowledge of the brigade appears to be most extensive on subjects connected with ordnance and the handling of weapons. Attention has been given to signaling, boating, spar torpedoes; lectures and instruction have been well attended. Many officers and men are earnest students of naval subjects.

PART BELONGING TO SEAFARING CLASS.

There are no mariners in the organization as far as can be learned.

READINESS AND AVAILABILITY TO MAN A SHIP OF WAR.

The great difficulty facing the brigade lies in the solution of the question of its usefulness. As a body of well-disciplined and intelligent men it is, of course, worth to the State of Massachusetts all that it costs. If it is prepared to act as militia in preserving public peace, both afloat and ashore, it is more useful than another organization having knowledge of infantry only.

It is of indirect value to the National Government from the interest in naval affairs which it promotes and stimulates in all classes of society. In case a large expansion of the list of officers of the Navy should become necessary in time of war, it could probably furnish many efficient men for the purpose, trained to naval discipline and methods, and skilled in drills and the handling of men.

The above advantages to the National Government are so great as to render the organization worthy of the support it has received. There does not seem, however, to be any prospect that the naval brigade of Massachusetts would ever, as an organization, enter the Navy for general service, and it can not, therefore, be considered as part of a national naval reserve.

The officers and men seem to have an idea that their services would be useful in time of war, in coast defense or harbor defense, but as the Navy has never yet allowed itself to be kept off the high seas in time of war, the naval brigade, by confining their sphere of action to harbors, would greatly limit their usefulness to the National Government. The Navy needs a reserve of seamen for general service, and this need is apparently as great as ever, the naval brigade not aiming to supply it.

In the event of the Navy Department stationing monitors or harbor-defense vessels in the principal ports of the country in time of war, they might be partially or wholly manned by the naval militia of the States, thus releasing the Navy crews for general service at sea.

In this case the presence of a few regular officers and men would probably be necessary aboard the ships to give the militia the practical training in ship life which they now lack. The absence of practical seamanship and knowledge of navigation amongst the men would prevent the organization from completely manning a cruising ship of war.

It was this year thought advisable to put the naval brigade in camp ashore, in order to give them experience in guard duty and camp routine, thus to prepare for service on shore. This experience was gained at the cost of practice afloat.

The character of the training actually needed must depend upon the purposes for which the organization exists, and as long as these are unsettled much time is thrown away.

If a conference could be had between a board of naval officers interested in the naval militia and the leading officers of the State organizations it is possible that a definite line of developments might be decided upon, enabling the State officers to so train their men as to render them of more direct use to the National Government, while not detracting from their legitimate duties under the State law.

Very respectfully,

JOHN A. RODGERS,
Lieutenant, U. S. Navy.
J. B. MURDOCK,
Lieutenant, U. S. Navy.
B. T. WALLING,
Lieutenant, U. S. Navy.

The COMMANDING OFFICER, U. S. S. MINANTONOMOH,
Boston, Mass.

RHODE ISLAND.

U. S. S. MIANTONOMOH,
Navy-Yard, New York, September 25, 1894.

SIR: In obedience to your order of the 13th instant, the board to report upon the efficiency of the naval reserves of Rhode Island has the honor to submit the following:

Two companies of naval reserves, one from Newport, R. I., known as the Naval Reserve Torpedo Company of Newport, and the other from Bristol, R. I., known as the Naval Reserve Torpedo Company of Bristol, reported on board this ship for drill at different times from September 17 to September 21. Each company consisted of 3 officers, a junior lieutenant, and 2 ensigns, and 54 men, a total of 57. The average daily attendance on board was about 50.

The naval reserve companies were organized in 1891, with the full quota of 57 permitted by the State.

Each company is organized as an infantry company, and is divided into three boat crews. As infantry, both companies are quite proficient; the same is true of their work in boats. At the secondary battery they did fairly well, and especially well in firing at a target. With the turret drill they were less familiar, but took much interest and acquired the needed information in a short time, manipulating the guns and appurtenances under the tutelage of the regular gun captains.

The officers wore the regular Navy service uniform, excepting that the sleeve stripes indicating rank were of gold lace and on the anchor of the collar the shield of the coat of arms of the State was superimposed. The men wore the regulation white working suits and white hats. They also have the navy blue uniform and pea jackets.

Neither company is to-day sufficiently conversant with ship life or familiar with gun drills to be able to man and fight this monitor. On the other hand, it is but fair to state that with further instruction and with encouragement and assistance from the State government and the Navy Department, the intelligence of the men and their evident desire to be of service will surely result in their becoming a creditable adjunct to the sea power of Rhode Island and the National Government.

The class of men who compose the naval-reserve companies of Rhode Island is a most deirable one. Engineers, machinists, boiler-makers, electricians, steam-fitters, carpenters, boat-builders, and fishermen form at least 50 per cent of the enlisted force. One sea captain and a licensed pilot are in the Bristol Company. In the Newport company, Lieut. Willoughby is a licensed pilot from Maine to Florida. He has also graduated at the War College at Newport, R. I.

No man of the reserves was called upon to work at his trade on board, but there is no doubt that any ordinary ship and engine repair could have been satisfactorily made. These mechanics might with propriety be organized into an efficient engineer force, though no such project seems to be contemplated.

In conclusion, your board holds that the Naval Reserve Torpedo companies of Newport and Bristol are composed of good material that could be developed by the Navy Department, for undoubtedly with care and proper instructions the organization can be made adequate to the performance of any of the ordinary duties likely to be demanded of a floating harbor defense, especially when placed under the supervision and direction of regular officers of the Navy.

Appended are a summary of the work done on board this ship and a synopsis of the instruction given at the torpedo station by Commander Converse, U. S. Navy.

Respectfully submitted.

RIDGELY HUNT,
Lieutenant, U. S. Navy.
BENJAMIN TAPPAN,
Lieutenant, U. S. Navy.
V. O. CHASE,
Ensign, U. S. Navy.

The COMMANDING OFFICER, U. S. S. MIANTONOMOH.

U. S. NAVAL STATION,
Newport, R. I., September 22, 1894.

SIR: The following is a synopsis of the instruction given to the Rhode Island naval reserve at this station:

The course occupied three days, divided into two periods each day, 9:30 a. m to 12 m. and 1 to 3 p. m., the instruction being under the immediate direction of Lieut. Holman.

Wednesday, 19th instant.—Lectures, explanations, and exhibit of spar topedoes and of torpedo apparatus. Notes on gun cotton. Practical illustration of testing insulated cables and of making splices. Practical illustration of priming and fusing service and exercise torpedoes. Exhibit and description of firing apparatus. Notes on various causes of accidents and precautions to be observed.

Thursday, 20th instant, Bristol Company only.—Rigged spar-torpedo launch and described boat fittings. Primed, fused, shipped, and fired from launch two exercise torpedoes. Lecture on automobile torpedoes. Exhibited and described principal working parts of Whitehead and Howell torpedoes. Notes on care and handling of torpedoes. Exhibited bracket system for stowing torpedoes and gave practical illustration of trolley system of handling and transporting torpedoes.

Friday, 21st instant, Newport Company only.—Carried out same programme as for Thursday, 20th instant.

Very respectfully,

G. A. CONVERSE,
Commander, U. S. N., Inspector of Ordnance, Torpedo Station.

Capt. T. F. KANE, U. S. N.,
Commanding U. S. S. Miantonomoh, Newport, R. I.

PROGRAMME OF DRILLS AND EXERCISES OF THE RHODE ISLAND NAVAL RESERVES, DURING THEIR TOUR OF INSTRUCTION ON BOARD THE U. S. S. MIANTONOMOH, AT NEWPORT, R. I., SEPTEMBER 17 TO 21, BOTH INCLUSIVE.

While embarked, the naval reserves were stationed as part of the regular crew of the ship, and performed the duties that appertain thereto as far as practicable.

First day, September 17.—A. M.: Embarked the reserve force; stationed them; divisional drill and instruction at main and secondary batteries. P. M.: Fire quarters; abandon ship; "setting up" exercise; disembarked reserves.

Second day, September 18.—A. M.: Got underway and proceeded to sea; while under way, exercised reserves at "heaving the lead" and stationed them as lookouts and at life buoys; target practice with secondary battery; divisional drill and instruction at main battery. P. M.: Great gun subcaliber target practice; disembarked reserves.

Third day, September 19.—Reserves instructed at torpedo station.

Fourth day, September 20.—Newport division, on board. Bristol division, torpedo station. A. M.: "Setting up" exercise; instruction at main battery; general quarters; instruction at stations at "arm and away" boats. P. M.: "Arm and away" boats; reserves manning their own boats and in charge of their own officers; boat exercise under oars in charge of their own officers; company drill in charge of their own officers; disembarked reserves.

Fifth day, September 21.—Newport division, torpedo station. Bristol division, on board. A. M.: "Setting up" drill; instruction at main battery; general quarters; instruction at stations at "arm and away" boats. P. M.: "Arm and away" boats; reserves manning their own boats and in charge of their own officers; boat exercise under oars in charge of their own officers; company drill in charge of their own officers; disembarked reserves.

CONNECTICUT.

U. S. S. ATLANTA,
Navy-Yard, New York, August 29, 1894.

SIR: In accordance with your order of the 13th instant, we respectfully report as follows on the efficiency of the naval militia of the State of Connecticut, as shown during their stay aboard this ship.

The militia came aboard at New Haven on the forenoon of the 13th instant. The force consisted at that time of 4 officers and 62 petty officers and enlisted men. The force remained aboard until the evening of the 18th, when it returned to New Haven.

The Connecticut naval militia was authorized by a State law passed last January, and did not effect a practical organization until June. Under these circumstances, no marked proficiency in any kind of drills is to be expected. Most of the instruction has been confined to infantry drill. The company has its headquarters at New Haven, the men living in the immediate vicinity of the city, or present there as students of Yale University. It has the use of a drill room in the armory of the Second Regiment, Connecticut National Guard, and has carried on weekly drills since its organization was completed.

The militia has a generous outfit from the State, each man receiving 1 blue dress suit, 2 working suits, 1 watch cap, 1 overcoat, 1 hammock, 1 mattress, and 1 Lee magazine rifle. Enough revolvers are furnished to supply about one-half the men, and 2 Hotchkiss 1-pounder R. F. guns with field carriages have just been received. The officers furnish their own outfit.

There is no one in the organization as either officer or enlisted man who has had any naval experience. Several of the men made the cruise on the U. S. S. *New York*, at the invitation of the New York naval militia and acquired some experience. The company also secured the services of two seamen of the *New York* for a few days as instructors. With the exception of the knowledge thus acquired they were all inexperienced when they came aboard this ship. It was therefore thought advisable to spend nearly all the time allotted in fundamental instruction, giving the preference in all cases to drills which could not be carried on ashore. The following schedule shows the instruction given:

August 13.—A. M.: Militia came aboard. P. M.: Great gun instruction.

August 14.—A. M.: Great gun instruction; first period. Secondary battery instruction; second period. Single sticks; second period. P. M.: Boat drill; fire quarters.

August 15.—A. M.: Subcaliber target practice. Single sticks. P. M.: Subcaliber target practice. Target practice with 1-pounder R. F. G.

August 16.—A. M.: Infantry. P. M.: Reception of governor of Connecticut.

August 17.—A. M.: Great guns; first period. Boat drill; second period. P. M.: Target practice, 6 and 3 pounder R. F. G. Heaving lead (petty officers). Fire quarters. Instruction in lashing hammocks.

August 18.—Returned to New Haven, and militia left the ship. In addition to the drills, the militia performed all duties connected with the care and cleaning of ship and battery ordinarily performed by the first and third divisions of the ship's company, which were ashore at Camp McAdoo, on Gardiner's Island.

ORGANIZATION.

The organization is officially designated as the first division, naval militia, Connecticut National Guard. The officers allowed are 1 lieutenant, 2 lieutenants (junior grade), and 2 ensigns, but one of the junior lieutenant's position is not filled. The law authorizes an enlisted strength of 81 men, the number at present on the rolls being 74. The following are the petty officers: First class, 1 boatswain's mate, 1 gunner's mate; second class, 1 boatswain's mate, 1 gunner's mate, 2 quartermasters; third class, 4 cockswains, 1 gunner's mate, 1 division bugler.

The division is divided into four gun's crews, each having a second-class petty officer as captain and a cockswain as second captain. Each gun's crew forms a section of infantry, the second and fourth gun's crews forming the first company, and the first and third the second company.

CLASS OF MEN.

The following partial memorandum was supplied by the commanding officer of the division, giving the occupations of the men as they were known: Twenty-four clerks, 11 students (Yale University), 5 lawyers, 4 merchants, 4 salesmen, 3 bookkeepers, 2 newspaper correspondents, 1 manufacturer, 1 clock-fitter, 1 draftsman, 1 boat-builder, 1 banker, 1 steward (hotel), 1 electrician, 1 pressman, 1 civil engineer. (List incomplete.)

The men were intelligent and zealous in their work, and apparently desirous of obtaining information and of giving satisfaction. They were generally of a good physique and bearing. None of the force are members of the seafaring class, but a majority have had more or less experience in small yachts.

The uniform of the officers is the Navy service uniform, the only difference being the substitution of the Connecticut State shield for the National in the cap device, and the cap visor covered with cloth. The men have the Navy uniform throughout, with the exception of the cap ribbon and the letters N. M. C. N G. on the breasts of the shirts. The blue dress suits were made to measure by contract, and were neat and well fitting, giving the command a most creditable appearance.

EFFICIENCY AND AVAILABILITY.

The division is severely handicapped by the absence of any one in the force who has had naval training or experence, and their progress toward an all-round efficiency as naval militia will necessarily be slow. There appears to be no idea in the minds of either officers or men of entering the Navy as an organization in time of war, their conception of their duties being mainly that of coast or harbor defense. They can not, in our opinion, be considered as a reserve force for the U. S. Navy, although some might enter individually.

From our experience with the naval militia the only case in which they seem to anticipate entering the Navy is as volunteer officers in time of war. If such officers are needed, many capable men could be obtained from the naval militia of the States, but the reserve of seamen for manning the ships must be sought for among old men-of-war's men and exapprentices rather than in the naval militia. They can be used to man harbor monitors or as crews of inshore torpedo boats under the orders of regular officers and in association with a few regular seamen. Their intelligence will enable them to quickly master the details of ordinary drills, but the presence of a few trained seamen is necessary whenever any seafaring work is to be done. It is impossible that any amount of shore training can give the handiness at wheel, lead, boats, and on shipboard generally that is necessary in an efficient ship's company.

The sphere of action of a naval militia is necessarily much more extensive than that of the ordinary State militia, as it involves nautical knowledge and experience in addition to military. To attain this end the recruiting should aim to include as many men of seafaring experience as possible, and should not be controlled mainly by social considerations. If the latter system is adopted the organization can readily become fairly proficient in infantry and purely military work, and thus give the

State some return for the outlay involved, but it will never rise to the height of usefulness which might be attained by men of experience afloat in developing the possibilities of the naval-militia system. This weakness is at present specially noticeable in the Connecticut naval militia, and the present usefulness and the future development of the command will be greatly advanced by including in the organization some officers or men of naval training.

Very respectfully,

J. D. MURDOCK,
Lieutenant, U. S. Navy.
P. SYMINGTON,
Ensign, U.S. Navy.
R. H. OSBORN,
Naval Cadet, U. S. Navy.

COMMANDING OFFICER, U. S. S. ATLANTA.

Approved and forwarded.

JOHN R. BARTLETT,
Captain, U. S. Navy, Commanding.

NEW YORK.

U. S. S. NEW YORK, FIRST RATE,
Off Tompkinsville, Staten Island, July 30, 1894.

SIR: In obedience to your order of the 21st instant, we have the honor to submit the following report upon the efficiency of the naval battalion, National Guard, State of New York, embarked on board this vessel.

The naval battalion came on board the *New York* while off Tompkinsville, Staten Island, about 10 a. m. July 21. At noon the ship got under way and proceeded to Gardiners Bay, Long Island, in company with the *San Francisco*, arriving during the forenoon of the 22d. While underway and in Gardiners Bay the battalion was exercised at fire drill, great-gun drills, night quarters, subcaliber practice, and boat exercise. Two reconnoitering parties were organized and remained in the boats or bivouaced ashore all night, making topographical notes and exercising at signaling.

Wednesday and Thursday, the 25th and 26th, were devoted to target practice with main and secondary batteries, signaling with stations previously arranged on shore in connection with the Army signal service of Fort Trumbull, and boat drill.

While embarked the men and officers of the naval battalion have been paired with those of the ship's company, and the regular ship's duties and routine have been carried out by the militia as far as circumstances and the exigencies of the service would permit. The total number embarked on this vessel was 198, composed of 9 officers and 123 men of the first naval battalion, and 6 officers and 60 men of the first and second separate naval divisions (of Rochester).

The men composing the naval militia are from the civil professions, and none belong to the seafaring class. Their naval professional knowledge has been acquired by study, exercises, and drills on board the *New Hampshire*, and in boats or armories, and the short annual cruises on men-of-war. Three of the officers, the commander and two lieutenants commanding divisions, have served as officers in the U. S. Navy.

The organization of the New York State naval militia is based on the division as a unit, and each division having a lieutenant in command with two subaltern officers, and 4 crews of 16 seamen each. The division's complement of petty officers is 2 boatswains' mates, 2 quartermasters, 4 coxswains, 1 gunner's mate, and 1 torpedoist. Four divisions constitute a battalion, under the command of a commander, whose staff consists of a lieutenant-commander, navigator, paymaster, surgeon, and assistant surgeon, and 8 chief petty officers, viz, master-at-arms, chief boatswain's mate, chief gunner's mate, electrician, chief quartermaster, ship's yeoman, pay yeoman, and apothecary. This organization was easily assimilated to the organization of the ship's company on the *New York* by giving the men numbers according to the scheme of the ship's station bills, the names of divisions remaining unchanged, the crews simply being called first, second, third, and fourth parts, according to the station bill, so that the ship's bill at once showed any man his station in the boats and at the guns.

While embarked on this vessel the militia have had four day's drill, principally at great guns, boats, and signals. The signalmen appear to be quite proficient in the use of the Myer's Code. The Navy General Code was used too little to permit any judgment to be passed upon their expertness with it. The men and officers are fairly proficient in the handling of boats under oars and sail. Although the calibers and carriages of this battery were entirely new to all the militiamen, the gun's

crews became quite efficient in a very short time, and their drill was good. The gun captains need instruction and experience in pointing quickly and accurately. Good shots were made at the targets with both main and secondary batteries, but as would naturally be expected from want of drill and practice the gun captains were slow in getting on the target. The men worked with great spirit and zeal and readily mastered the details of the drill. Still better results would have been obtained had care been exercised in selecting the men to fill the stations at the guns according to their physical development, giving the heavier men to those stations requiring strength and weight.

The uniform of both officers and men is practically that of the Navy as far as the working or service dress is concerned. All members have a full dress for social occasions, men and officers being in the same uniform. The uniform is of good quality and design and seems to give satisfaction.

Opportunity for the militia to acquire professional knowledge has been very slight. The men are, in intelligence and education, far above the normal of ship's crews in the Navy, and they are zealous, learn very easily; and remember what has been told them; but a fair-weather cruise of a few days in a ship fully manned by service men has given no opportunity for an opinion on the extent or value of the professional knowledge of the naval militia.

Following closely upon a discussion of the professional knowledge, and intimately connected with it, is the question of their "efficiency as seamen, firemen, or ship's artificers." In a fighting machine like the *New York* the word "seaman" can be properly used only to indicate a grade below that of petty officer, a man belonging to the deck or combatant force of a ship. Its former meaning can not be considered in the newer vessels. On this presumption the majority of the militia have proved themselves to be efficient in manning the guns and keeping them in order, and in delivering their projectiles with a credible degree of accuracy. There were no firemen among the militia, but in the Rochester divisions are two men who would be valuable as water tenders or oilers in the engineer's department.

The First battalion's electrician is capable of taking entire charge of the electric plant of this vessel, and can supervise the wiring of a mining field. In the Rochester divisions are two practical electricians, who can take charge of a ship's plant, run a dynamo, make any repairs to it, and do all other work required in the electric system of the ship. This division also includes 3 skilled machinists, 2 good machinists, 2 men capable of firing and running a steam launch, 1 ironworker, who would be a good assistant boilermaker, 1 brassworker and coppersmith. It is understood that men of these professions have been sought for as members of the Rochester divisions, and the result is very creditable.

It is believed that the force could be made ready and available in a very short time for manning a ship of war lying in New York Harbor. Their efficiency immediately after embarkation would depend upon their previous instruction. Of the force now on board, for example, good officers and men could be furnished for manning 8-inch gun turrets of a battle ship, two 8-inch C. P. guns, and the R. F. battery of any cruiser. Efficient signal men could also be furnished, and a number of very valuable artificers.

In the organization of the interior line of defense of our coasts the State naval militia must be considered as a highly important factor. The maintenance of the first or outer line naturally will fall to the regular Navy, with its seagoing battle ships and cruisers; but this line is of such great extent and the available force so limited that some other corps must undoubtedly be entrusted with the actual defense of the coasts and harbors, manning the coast guard ships and improvised torpedo boats, planting mine fields, and the littoral communications by signals. This branch of the defense would seem to fall most naturally to the naval militia of the State threatened, with cooperation of militia from neighboring States most concerned. In a coast of as great extent and as full of numerous bays as that of the United States, a thorough knowledge of each harbor, island, or point of vantage can not be attained by any single corps, but where such knowledge is of vital importance to the defense of a position it is but reasonable to conclude that it will be acquired more thoroughly by those whose interests are most at stake—the State itself—than by any other branch of the national services. The exercises of reconnoissance, and the study of the defense problem by the militia on board this vessel, show a most gratifying comprehension of the subject and a remarkable degree of progress in the solution of the question for their own State waters. Cooperation in plans of operations and signal communication with the militia of Connecticut and New Jersey are necessary to complete the plans for the defense of the approaches to New York, as far as the naval militia is concerned.

In conclusion, the board is of the opinion that the naval militia is of the greatest value as an adjunct to the Navy, and recommend that every practicable facility be given the organization to perfect its members in the drills, exercises, and study of the highly important duty of forming the interior line of coast defense, which natu-

rally falls to a State organization. In particular attention is respectfully called to the lack of the most ordinary apparatus for the instruction of the first and second separate divisions at their home in Rochester. It is recommended that two cutters and one whale boat of the number now at the navy-yards, and probably never to be used again by the service, be given these Rochester divisions, with a complete outfit of sails, oars, etc., together with a 1-pounder or 37 millimeter on field or boat mount, with a subcaliber attachment for target practice. The fact that the drills and efficiency of these divisions are fully up to the standard is all the more creditable to their zeal and ambition.

It is believed to be of the utmost importance to the National Government to assist in every way the development of this branch of the national defense, and especially to foster and encourage the growth of such organizations on the shores of the Great Lakes.

Respectfully submitted.

E. D. F. HEALD,
Lieut. Commander, U. S. Navy.
JOHN F. PARKER,
Lieut., U. S. Navy.
ROBT. B. DASHIELL,
U. S. Navy.

The COMMANDING OFFICER, U. S. S. NEW YORK.

U. S. FLAGSHIP SAN FRANCISCO,
Navy-Yard, New York, July 31, 1894.

SIR: In obedience to your order of the 21st instant we have the honor to make the following report on the efficiency of the detachment of naval militia embarked on board this ship:

Two divisions of the first naval battalion of the State of New York, numbering 120 officers and men, under Lieut. Commander George D. Kent, of that battalion, and 15 men of the Rochester naval division came on board at this navy-yard on Saturday morning, July 21. A detailed report of attendance is inclosed herewith. The ship then left the navy-yard, and proceeded to Gardiner's Bay by the outside route, being joined by the *New York* when passing Staten Island. The naval militia passed the succeeding week in exercises at great guns, target practice when underway with both the main and the secondary battery, fire drill, abandon ship, boat exercise both under sail and oars, fleet tactics in boats, and in signalling between the ships and various signal stations which they had established on Gardiners Island, Plumb Island, Fishers Island, and the mainland. Both officers and men performed also all the routine duties of the ship according to their several ranks and ratings, including scrubbing decks and cleaning the paint work and the ship's side.

Regarding certain subjects specified in your order we report on them as follows:

(1) Professional knowledge: Very good on points connected with coast work around New York and Long Island Sound, such as boat work, piloting, and general information, but only fair when viewed from a broad naval standpoint. The average of intelligence and education is so high, however, that it is believed that in time of protracted war the requisite professional knowledge could be acquired; but at present the real professional knowledge of both officers and men, while greater than might have been expected from their opportunities, is nevertheless far below that of the officers and men who hold the same ranks and ratings in the regular service; in other words, the officers and men of the naval militia hold ranks and ratings far above those of the officers and men of equal professional knowledge in the Navy.

(2) Organization: Very good. It follows very closely that of a regular United States Navy vessel. A roster showing the organization is inclosed herewith.

(3) The boat drill is excellent, and both officers and men show a great deal of skill in handling boats both under oars and under sail. The drill with great guns and the secondary battery is good, and with more practice would undoubtedly become excellent, because the superior intelligence and the willingness of all would render the mastering of these drills a very simple matter. Fire drill: Very good. Abandon ship: Fair. Signalling: Excellent. Target practice: Very good.

(4) Uniform: Very good. The uniform of the men is practically identical with that of the Navy. The men are required to have only 1 suit of blue and 2 suits of white; but, when necessary, more could be obtained with but little delay. The service uniform of the officers is the same as that of the Navy, save in small details, and except that gold-lace stripes, indicating the rank, are worn on the sleeve. It is understood that these stripes are to be abolished, and that frock coats are to be

adopted, like those of the service, in addition to the blouses. There is no dress uniform; doubtless one could readily be adopted, if found desirable.

(5) Efficiency as seamen: Only tolerable, except in the management of boats. Efficiency as firemen: There are none in the battalion. Efficiency as ship's artificers: There were but two on board, an electrician in the New York contingent and a painter in Rochester contingent. Both seemed capable men.

(6) Readiness and availability to man a ship of war: The naval battalion was organized under the provisions of paragraph 281, Article xv, chapter 17 of the general laws of the State of New York, "for the defense of coasts, lakes, and harbors." For this service it may be said that the naval battalion is always ready and available; but it is very doubtful if it would be found ready and available for regular cruising service, since nearly all have important business interests on shore. At the same time it must be pointed out that these men have taken an oath to support the Constitution of the United States, and that they can be compelled to obey at once any call of the governor equally with the land militia; and that, if called into service by the President in time of war, they would become part of the naval force of the United States, and subject to its discipline. If placed on board a coast-defense vessel, such as a monitor, together, and without losing their identity as a distinct organization, they would probably do admirable service in war time, and they might do good service then even on a foreign station. But it is more than doubtful if the men of the naval militia would ever do good service if the attempt were made to incorporate small numbers of them in the crews of regular Navy ships, for the reason that their early education and training have been different from those of the men by whom they would be surrounded.

(7) Regarding the class of the people who compose the naval militia, tables are herewith inclosed showing the name, rank or rating, age, occupation, and length of service, both in the militia and the Navy, of each person embarked on board this ship. From these tables it will be seen that not one belongs to the seafaring class, that only four have served in the Navy as commissioned officers, and none as enlisted men. (Tables omitted.)

The discipline, willingness, and earnestness of officers and men, and the progress they made during their week on board this ship, seem to the board to indicate that, along certain lines, they would form an efficient adjunct to the Navy in time of war. The reports of their officers in charge of boat expeditions sent out to report upon the topography of the country surrounding Gardiner's Bay and adjacent waters, together with the diagrams prepared by seamen showing the location of various signal points and their bearing and distance from each other, indicate a comprehensive understanding of their duties as a reserve in assisting the regular Navy in case of a threatened or actual occupation of this locality by a hostile force. Their professional knowledge and experience, however, are not in the line of the sea officer, or the seaman, but rather in the line of the coast guard; and it is believed that they could do most valuable work, not in the first line of defense, but in the second.

We have the honor to be, sir, very respectfully,

B. A. FISKE,
Lieutenant, U. S. Navy.
A. G. HODGSON,
Lieutenant, U. S. Navy.
W. J. SEARS,
Lieutenant, U. S. Navy.

The COMMANDING OFFICER.

PENNSYLVANIA.

U. S. FLAGSHIP NEW YORK, FIRST RATE,
Off Reedy Island, Delaware River, August 14, 1894.

SIR: In forwarding the report of the board, with the indorsement of Capt. J. W. Philip, I wish to say that I agree with the board that exercises in light-draft gunboats, improvised torpedo boats, etc., would be very valuable if such vessels were available, but such drills should be supplemented, as Capt. Philip says, by an annual cruise of short duration in a large seagoing ship of war. Furthermore, the advantage to these young men of competing in a squadron of say seven or eight vessels with the battalions of other States would be incalculable. The emulation which is sure to develop from State pride—always laudable—would be a powerful factor in urging them to excellence, and incidentally this manly and honorable competition should benefit all branches of the regular Navy by placing our own officers and men on their mettle as instructors.

I do not believe that the naval militia will ever be "sailors," in the sense we use that much-abused term in the regular Navy, but these organizations are of great

assistance to their respective States for service on the water in times of riot or trouble and would prove of great value to the National Government in time of war.

It must be remembered that these young men are recruited from a far different class than the average seaman or marine. Most of them are men of good social position and means, of liberal education, and not a few are the star men of their colleges or academies, and many are trained athletes in the various popular sports of the day, such as rowing, football, yachting, etc. They are, as a rule, of most admirable quality physically and mentally, and I look upon them not as landsmen qualifying as seamen, but rather as cadets under drill, qualifying themselves to fill the place our merchant officers did at the outbreak of the late civil war, or, to put it more forcibly, they may be compared in quality to the members of that crack New York militia force, the Seventh Regiment of the National Guard. While it is true the Seventh Regiment (as the late Gen. Butler sarcastically observes in his book) never faced the enemy *as a regiment*, yet the organization sent over 1,500 men to the field as *officers*, all of whom did well in actual war and some rose to the rank of major-general.

In the event of a maritime war, our greatest need would be intelligent officers in the lower grades. These the naval militia can surely supply. The bone and muscle can be drawn from the less intelligent deck hands in the coasting or inland waters trade.

The naval militia can be relied on after a few years' drill and encouragement to fill the subordinate positions of the quarter-deck, and the fishermen and coasters and men of the great lakes and rivers to do duty "behind the gun." That we shall surely need these men, if a great maritime war comes suddenly upon us, is a fact so obvious to all officers of experience that a dispute over it is a loss of time.

The regular Navy could not supply the number of officers that will be needed in such an emergency, and our mercantile marine is too insignificant at this time to be depended on for such additions as came naturally to the Navy from it in 1861.

I think the Navy Department and Congress should do all in their power to stimulate and encourage the naval-militia movement. Nothing more wise, patriotic, and popular with the American people can be done by the authorities and representatives of the Republic.

Very respectfully,

R. W. MEADE,
Rear-Admiral U. S. Navy,
Commanding U. S. Naval Force on North Atlantic Station.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

[First indorsement.]

U. S. S. NEW YORK,
Off Reedy Island, Delaware River, August 14, 1894.

Approved and forwarded to the commander-in-chief.

In regard to the conclusion of the board (paragraph 12), "that exercise in light-draft gunboats, improvised torpedo boats, etc., would be of more value than an annual cruise in a large seagoing ship," I beg to differ in opinion; for although the exercise described is very essential for the defense of the Delaware, yet an annual cruise in a regular commissioned man-of-war is of great value, both to the naval battalions and crew of the vessel interested, and should be taken in addition to the above exercises.

I desire to emphasize the recommendation of the board, that the naval militia of Pennsylvania may be furnished with boats, guns, etc., for the purpose of drills; for without these necessary means the zeal and interest of the militia will soon flag, or cease entirely.

J. W. PHILIP,
Captain U. S. Navy, Commanding.

U. S. FLAGSHIP NEW YORK, FIRST RATE,
Off League Island, Pa., August 13, 1894.

SIR: In obedience to your order of the 8th instant, the following is respectfully submitted as a report upon the efficiency of the naval militia, State of Pennsylvania, embarked on this ship:

The organization was received on board the morning of August 8, while the ship was at anchor off the League Island navy-yard. The officers messed in the cabin, wardroom, and steerage according to rank, and the petty officers and men formed messes of their own, separate from the ship's company, with men detailed from the

crew to cook for them. The messes forward furnished their own provisions. The men were given numbers according to the ship's station bill, and both officers and men were paired in watches and other duties with those of the ship's company.

At daylight of the 9th the ship got under way and proceeded down the river, anchoring off Delaware Breakwater at dark. The day was occupied in instruction at the guns, great gun, and fire drills, and overhauling and cleaning the main battery. The following day the ship lay at anchor, and opportunity was given all divisions for practice with subcaliber, turret, waist, and 4-inch R. F. guns. The shooting was very good. The divisions which had been stationed the previous day at the spar-deck guns changed places with those on the gun deck, so as to permit all to have experience with both turrets and the R. F. battery. Instruction was given in the theory of signaling, and the divisional officers were allowed to work the search lights and Ardois system.

On Saturday, the 11th, the ship went to sea at daylight for target practice. The militia were drilled at general quarters and fired at a target with both main and secondary batteries, the range varying from 1,200 to 1,800 yards. The shooting was good, but few wild shots being made. Returning to the anchorage, the militia were exercised at pulling in the ship's boats in the afternoon, and with the search lights and Very's signals at night. On Sunday, the 12th, the ship returned to League Island and the militia disembarked at 11 a. m. on the 13th.

The force embarked consisted of divisions A and B of the first naval battalion (Philadelphia) and division A of the second naval battalion (Pittsburg), naval force, State of Pennsylvania. The first battalion was composed of the following: Commander, 5 staff officers, 4 petty staff, and 2 servants. Division B: 3 officers, 42 men, and 4 servants. Division A (second battalion) consisted of 5 officers, 68 men, and 7 servants. Total number embarked, 68 officers and 157 men.

The organization is as yet incomplete, owing to the short time in which the force has been in existence. It is to be that of a ship's company of four division, swith a divisional maximum strength of 5 officers and 84 men. The addition of a marine engineer corps of 2 officers and 20 men is contemplated. The force is under the command of a commander, with a staff of executive officer, navigator, paymaster, 2 surgeons, and 4 chief petty officers.

The members of the militia are all from the civil professions and none from the seafaring class. The commander, executive, and one lieutenant commanding a division have been officers in the U. S. Navy. The opportunities for acquiring professional knowledge have been very meager. The first battalion made a cruise of five days on the *San Francisco* last year, which is the only ship experience of the organization up to the present cruise on the *New York*. The second battalion has had no naval training of any kind previous to this. The men are all very intelligent and zealous, and readily learn and retain information on naval subjects. That their professional knowledge is deficient is due entirely to the fact that they have never had an opportunity to acquire it.

Considering the short time available for instruction (two days only), the gun drill of the militia was good. Their target practice was satisfactory, and the service of the guns intelligent and efficient.

The uniform is very similar to that of the Navy, only the undershirt has a breast piece of blue and white stripe pattern worked on it. It is recommended that each man be provided with three white working suits, two blue suits, blue flannel undershirts, and black leather shoes.

There are no firemen in the organization. Five electrical engineers and three mechanical engineers constitute the number of artificers available.

The force has been too recently organized to be considered at present as available to man a ship of war, except as an addition to a naval crew or to fill out the cadres of a ship in the first reserve.

As a defense of Delaware Bay must be regarded as of prime importance, the development of a sufficient naval militia in the States of Pennsylvania, New Jersey, and Delaware becomes practically a national question, as well as a State necessity. The Pennsylvania State force at present has a nucleus of about 200 men and officers, glad to avail themselves of every opportunity offered to acquire a knowledge of their profession. The defense of the bay and river is their objective, and their operations would hardly extend beyond the capes. They should therefore acquire the knowledge necessary for handling the vessels and weapons suitable for river operations, rather than those for the high sea. To this end, it would seem that exercise in light-draft gunboats, improvised torpedo boats, boat service, the planting of mine fields, etc., would be of more value than an annual cruise in a large seagoing ship.

Signal communication between the militia of the three States named is of the utmost importance, and signal stations should be selected from point to point. The development of an expert signal corps is of equal importance to that of the gun division. At present the Pennsylvania naval force has the hulk *St. Louis* as a place of rendezvous, but there are no proper appliances for instruction in any branches

of their profession. The board do therefore respectfully recommend that the Navy Department lend the organization a steam launch, two cutters, and a whaleboat, with their outfits complete, a 1-pounder gun (with field and boat mount), and a 6-pounder gun, with ammunition for both calibers, a 4-inch R. F. gun and mount, with dummy cases, for drill, and a supply of the latest ordnance instructions, and such signal instructions as are not confidential.

Very respectfully,

E. D. F. HEALD,
Lieutenant Commander, U. S. Navy.
JNO. F. PARKER,
Lieutenant, U. S. Navy.
R. B DASHIELL,
Lieutenant, U. S. Navy.

The COMMANDING OFFICER, U. S. S. NEW YORK.

NORTH CAROLINA.

U. S. S. MONTGOMERY,
Yorktown, Va., August 30, 1894.

SIR: I have the honor to inclose herewith the report on the naval militia of North Carolina, made by officers detailed by me in accordance with the Department's orders of August 10.

I have little to add to this report, as my own opinion, based on personal observation, coincides with that of the officers who signed the report. It speaks very highly for the militia that they were willing to bear the whole expense of the drills, and to incur the temporary hardship of life on board a very inadequately equipped vessel. The fact that they brought the *Nantucket* down from Wilmington unaided speaks for itself. On the other hand it would be impossible to ignore the defects of organization which are inherent in the militia system itself.

All that was done by this battalion was purely voluntary, and done under the stimulus of popular enthusiasm for present naval progress; but, according to Lieut. Winslow's own report, out of a total of 163 officers and men only 84 were present, but 50 per cent of the force, and there seems to be no power to compel attendance. One officer at least, the surgeon, was absent from lack of interest. There is no doubt that under the instruction of competent and zealous officers, graduates of the Naval Academy, the battalion could be, and has been, brought into shape for service in a creditably short time, but there is always a serious doubt how far the present enthusiasm would carry the individual members in a question of real war and invasion. Until this question can be satisfactorily answered it would be impossible to form any just estimate of the value of a naval militia as an auxiliary of the regular Navy.

Very respectfully,

C. H. DAVIS,
Commander, U. S. Navy, Commanding.

The SECRETARY OF THE NAVY.

U. S. S. MONTGOMERY, THIRD RATE,
Yorktown, Va., August 28, 1894.

SIR: In compliance with your verbal order, we submit the following report upon the efficiency of the North Carolina naval militia, based upon the Navy Department's letter of the 10th instant, addressed to you.

ORGANIZATION.

Complete information on this subject will be found in a letter appended to this report and marked A A, from Francis Winslow, commander, commanding naval battalion, North Carolina State Guard, to the senior member of this board, together with his inclosures, marked A and B. Inclosure A should be read in connection with Commander Winslow's remarks to get a thorough understanding of the conditions under which organization is effected. As far as our observation enabled us to judge the organization is effective. (All inclosures omitted.)

CLASS OF MEN.

Commander Winslow's letter, appended, also gives all the information at hand regarding the class of men composing the naval militia under his command, the proportion of seafaring men, and the number of those who have served in the Navy. There seems to be only three of the last-mentioned class, of whom two were officers.

UNIFORM.

Commander Winslow's letter and its inclosures, marked D, refer to the uniform regulation. The officers wore service dress and the men white working clothes. With a few exceptions the command was correctly uniformed.

PROFESSIONAL KNOWLEDGE AND EFFICIENCY AS SEAMEN, FIREMEN, AND SHIP'S ARTIFICERS.

Considering the fact that the *Nantucket* was commissioned, gotten underway, and taken from Wilmington to Southport in less than twelve hours, and that all this trip, which extended into the night, her engines were run, the monitor navigated and handled entirely by the naval militia, the board considers their professional knowledge and efficiency highly creditable. Furthermore, the monitor having dragged her anchor during the night, assistance was declined, steam gotten up, the anchor raised by a deck-tackle and the ship taken alongside a wharf and secured, entirely by her own force. The condition of the engines before the monitor was commissioned is described in a report by Chief Engineer Furlong, marked E. The engineer officers during their hours of leisure and on Sunday got the engines in condition to make the cruise. The naval militia have no enlisted men of the artificer class.

EQUIPMENT AND DEFICIENCIES.

The equipment is incomplete, inadequate, and in poor condition, and a list appended marked F. will show how serious these deficiencies are. There were no medical stores, instruments, nor appliances on board, and the medical officer of the battalion was absent during the cruise. Such medical attendance and medicine as were required were furnished by this vessel.

DRILLS.

The board witnessed the following drills on board the *Nantucket*—great guns—artillery, with 3-inch B. L. R., and stations of the powder division for general quarters; also infantry drill on shore. The drills were creditably performed and showed careful instruction and attention to detail. The battalion came on board the *Montgomery* several times and were instructed and exercised at the main and secondary batteries and at target practice with the 6 pdr. subcalibers. While on board the ship, the men were attentive, showed zeal and intelligence, and the subcaliber-practice was very good.

READINESS TO MAN A SHIP OF WAR.

As previously shown in the report, the *Monitor* was commissioned, manned, handled, and navigated entirely by her own force; a regular watch was kept night and day, and regular routine observed, and, therefore on this subject, the board can not but report favorably.

Very respectfully,

W. H. EVERETT,
Lieutenant, U. S. Navy.
J. O. NICHOLSON,
Lieutenant U. S. Navy.
H. S. KNAPP,
Lieutenant, U. S. Navy.
J. M. POYER,
Ensign, U. S. Navy.
F. B. SULLIVAN,
Ensign, U. S. Navy.
C. T. JEWELL,
Ensign, U. S. Navy.

Commander C. H. DAVIS, U. S. N.
Commanding U. S. S. Montgomery.

NAVY-YARD, NORFOLK, VA., *August 27, 1894.*

SIR: In obedience to the Department's order of August 8, 1894, and instructions of August 7, 1894, I have the honor to make the following report upon the cruise and drill of the North Carolina naval battalion, between August 12 and August 21, inclusive, of this year.

On August 12, I found the naval militia ship *Nantucket* in condition to move as far as boiler power was concerned.

The Wilmington division placed the *Nantucket* in commission at 12 m., Sunday August 12, and about 3:30 p. m., left the dock at Wilmington, and proceeded down the river. Commander Francis Winslow, North Carolina State guard, in charge. The navigator, Lieut. J. W. Harper, as pilot. The vessel was underway about half the time during darkness, and successfully anchored at Southport that evening.

This division fully proved their ability to place the ship in condition for active service without aid from the Government forces.

The engineer department has overhauled and put in fair condition the main engines, boilers, pumps and blower engines, all of which were in very bad condition when the ship was received. This department deserves special notice. The turret engines are not in condition to turn the turret, nor is the windlass engines in order owing to a bent shaft. Considering the various subjects upon which the Department ordered me to report, I find—

PROFESSIONAL KNOWLEDGE.

Commander F. Winslow and Lieut. J. H. Barnard, commanding the Wilmington division, are graduates of the Naval Academy and fully qualified to perform all duties required of officers afloat, as pilots and masters of vessels, and navigate both inland waters and at sea. To the unceasing work and watchfulness of these two officers is due the success of the work this year.

One man is honorably discharged from the U. S. naval service, having been an apprentice. As regards the others, many have had much experience in handling yachts and boats. Several are yacht-owners, sail their own yachts, and are capable men. This does not include the Charlotte division, as they come from far inland and are deficient as boatmen, owing to lack of facilities for practice. The battalion as a whole is fair at boat drills.

The men have been well instructed in infantry, howitzer, and great-gun drill, but lack practice in last named. Close attention was paid to instruction and the drills were fairly well conducted.

The battalion can furnish a sufficient number of engineers and machinists to handle the machinery efficiently.

The fire-room force are enlisted for the cruise and do not belong to the regular organization. Apparently there would be no difficulty in obtaining a sufficient number of men for this work in case of emergency.

A set of signal boys has been organized, and the quartermasters also are fairly efficient in that line. In conclusion on this subject, I find the battalion in good working order as to professional knowledge.

ORGANIZATION.

The divisions are combined into a ship's company, and upon reporting are detailed to their different duties according to skeleton watch, quarter, boat, and fire bill. In this manner each man is quickly placed and no confusion ensues, and it proved effective upon this occasion. There is no settled plan for provisioning the ship. Sea stores can be obtained in Wilmington without delay.

Messing was by regular crews, the food being furnished by caterer. I do not think it could be depended upon in case of being called into active service.

DRILLS.

The men are well drilled in infantry and howitzers. Boat drills have been limited to the Wilmington and Newbern division, there being no facilities for this drill by the Charlotte division, except that done while on the cruise last year and this. Cutlass instructions have been given each division, the Newbern division has only had great-gun drill during the time the *Kearsarge* and *Montgomery* have been in Southport, though this and the Charlotte division have received full instruction in this branch. The Wilmington division was well drilled at great guns. Thirty-six drills and parades are required to be held each year. I am informed the attendance is good and quite a number of extra drills have taken place. The good result of target practice with 3-inch B. L. H. leads me to think that the men have been carefully and properly instructed in all branches. As no practice was had with the turret guns, I can not speak with authority on that point, but the exercise at great guns was satisfactory.

UNIFORM.

Under a late order the uniform is made the same for all divisions and closely follows the regulation uniform of the U. S. Navy; at present the Wilmington division is the most completely uniformed, the Newbern partially in regulation uniform, but the Charlotte division has a uniform of its own designing, which is totally unfit for the duties they are required to perform. This is being changed, however, to a compliance with the general order on the subject.

Officers' uniform consists of the Navy blouse and devices, with gold lace for sleeve mark, blue trousers, caps same as those worn by officers of the Navy, except that the device bears the letters N. C. in place of the shield. This uniform is neat and well adapted for practical use.

EFFICIENCY.

Seamen.—There are no regular seamen in the battalion with one exception. Considering seamanship alone, as many members are yachtsmen, they have considerable experience in handling sails, steering, etc. There was no trouble in finding a sufficient number of good helmsmen; otherwise they are not efficient seamen.

Firemen.—The firemen are enlisted for the cruise, being paid by the battalion, and belong to tugs and steamers plying on the river and sounds. They are fully capable of performing all duties in the fire room.

Mechanics.—Two marine engineers and one shore engineer. There are also some locomotive engineers and shop machinists. The latter could perform the duties of blacksmiths.

Armorers, etc.—As will be seen by Chief Engineer Furlong's report, this force has overhauled and put in order various engines and pumps, and repaired leaks in boilers and tubes. They proved efficient.

Readiness and availability to man a ship of war. When called upon for active service attendance is compulsory. At one time the Newbern division was called out, and was ready in a few hours with an attendance of over 90 per cent. The battalion could be landed in Norfolk for service on a fully-equipped vessel in about twenty-four hours. It could be placed at Southport, with the monitor ready for action, within the same time, but the *Nantucket* is in such bad condition that she will be unable to go to sea.

In view of the numerous instructions and drills, and considering the exceptional intelligence of the men, I conclude that the force would be of service to the Government in case of necessity. The act creating it places it on the same footing as the militia of the State as regards being called into service by the General Government. It will also furnish a fairly effective set of junior officers for watch and drill, as they are all well instructed in that particular, and thus would relieve regular officers for seagoing ships.

The gun captains are good marksmen, making good shots with the secondary battery of the *Montgomery*, guns they had never seen before, while with a 3-inch B. L. H., out of 9 shots, 6 struck the target at 750 yards, the first shot going high, as the range was set at 890 yards. All would have struck a vessel.

Class of men.—As will be seen by the inclosed lists, the men are of many occupations and professions. There are a number of electrical experts used to wiring, working dynamos, motors, etc. They are intelligent, young, and active. Their conduct was exceptionally good, not a case of intoxication, though there was every opportunity to obtain liquor.

With a short experience on board a modern ship of war, they would furnish specialists in most of the branches of the naval profession.

Seafaring class.—There are no deep-seagoing men in the organization, but Lieut. Harper is captain of a steamer plying on the Cape Fear River. But two or three others have been engaged in that line. Four machinists are engaged in tugs on the river and sound. Several members have been employed in deep-water sailing, though none at present go to sea for a living. Three officers are competent navigators and licensed pilots.

Service in U. S. Navy.—Two officers are graduates of the Naval Academy. One boatswain's mate served his apprenticeship in the Navy. No others have been in any manner connected with the service.

On Thursday, August 16, about midnight, the vessel dragged about half a mile. The crew was kept on deck working, tending ship, etc., until 4 in the morning, and worked all the forenoon getting under way, and clearing a foul anchor. Notwithstanding this unexpected and unusual work I heard no complaint from anyone.

This mishap, however, gave them valuable experience.

The discipline is fair, though of course not as rigid as that of the regular man-of-war. There was a marked improvement in this particular, as well as the bearing of the men toward the officers, during the last days of the cruise.

The officers requested me to advise them in their duties as deck and divisional officers, and correct mistakes. This was done and received in the proper spirit.

The officers show great zeal in carrying on their work, and keep as thoroughly posted in matters pertaining to the naval custom and work as is possible with the materials at hand. The articles for the better government of the Navy are by law applied to the naval battalion, and are read at muster on Sundays.

The improvement in the men, great interest all took in learning their duties, drills, etc., leads me to think that the cruise as a whole has proved very successful and of much benefit to the organization.

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Respectfully submitted.

F. H. TYLER,
Lieutenant, U. S. Navy.

SECRETARY OF THE NAVY.

MICHIGAN.

U. S. S. MICHIGAN,
Detroit, Mich., October 23, 1894.

SIR: In obedience to your order, we have the honor to submit the following report upon the efficiency of the first division of the Michigan State naval brigade:

The reserves were instructed and exercised on board on Tuesday, October 16; Wednesday, October 17; Friday, October 19, and Saturday, October 20, reporting on board at 8 a. m. each day and landing again at 5:30 p. m., 4 p. m., 6 p. m., and 3 p. m., respectively. The force consisted each day of 41, 39, 49, and 39, respectively, four of whom were officers who attended daily.

ORGANIZATION.

The data regarding organization, etc., was furnished by the officers of the reserve division, by request, and is appended to this report.

UNIFORM.

The uniform for officers is the Navy service uniform, with the single exception of the cap device. Only one uniform is required. The men are furnished with one blue suit in all respects the same as the Navy blue uniform for seamen, also one working suit of Navy pattern.

CLASS OF MEN.

The present members of the division are drawn from among the best educated and most intelligent classes of the community. Those men who participated in the exercises on board were generally of a good physique and bearing. They were as a rule exceptionally intelligent, readily comprehending the duties assigned them, and very desirous of obtaining information. The zeal displayed in the performance of all duties assigned them is commended. Many of the men attended the drills at the sacrifice of considerable business interests. The expectation of exercising on board the U. S. S. *Michigan* this year had been abandoned, and at this time it was exceedingly difficult to leave their various employments.

DRILLS.

Owing to the fact that the divisions have had no equipments except a number of Springfield rifles, borrowed from the Detroit light-infantry battalion, their drills previous to coming on board consisted of company drill, knotting and splicing, signaling, and technical instruction. While on board the following programme of exercises was carried out:

Tuesday, October 16, 1894.—A. M.: (1) Inspection by the board; (2) reserve officers stationed men, watch, division, boat and mess; (3) getting ship under way; (4) instruction at battery. P. M.: (1) Fire quarters; (2) instruction at gatling and pistols with cutlass; (3) signals; (4) laying aloft.

Wednesday, October 17, 1894.—A. M.: (1) Company drill; (2) battery drill; (3) fire quarters. P. M.: (1) Instruction in pulling boats; (2) fleet tactics; (3) reserve make details for arm and away and abandon ship; (4) instructions at lashing a hammock; (5) laying aloft.

Friday, October 19, 1894.—A. M.: (1) Battery exercise; (2) subcaliber rifle and pistol practice. P. M.: (1) Great gun target practice.

Saturday, October 20, 1894.—A. M.: (1) Arm and away boats; (2) fleet tactics. P. M.: (1) Fire quarters; (2) abandon ship; (3) heaving lead and log; (4) laying aloft.

PROFESSIONAL KNOWLEDGE.

The commanding officer of the division, Lieut. Gilbert Wilkes, is a graduate of the Naval Academy, and for seven years held a commission as ensign in the U. S. Navy. The remainder of the division, with the exception of the bugler, who is an ex-apprentice, have had no previous naval experience. Several of them are yacht owners. One member holds a master's certificate, and another a pilot's certificate for waters adjacent to Detroit. Many of them have had considerable experience on yachts, both steam and sail, and possess more or less knowledge of lake navigation. One member is a naval architect and has designed several yachts. Another is a graduate in marine engineering from Cornell College, and has devoted most of his time since to engineering.

EFFICIENCY AND AVAILABILITY TO MAN A SHIP-OF-WAR.

In consideration of the fact that the division had never been exercised in the drill on the programme, the regular crew were first exercised as instruction, the reserve officers and men thereafter exercising alone. On coming on board the division was stationed by their own officers as an independent crew, there being a sufficient number to fill all details except the engineer's force. Starting as they did, with an almost absolute lack of knowledge of man-of-war routine and drills, they showed marked adaptability, performing at the end all the duties with considerable efficiency. The target practice, both small arms and great guns, was very creditable.

VALUE AS A NAVAL RESERVE.

We consider that this division would be of great value to the United States on the lakes, from their efficiency as an armed force and their knowledge of marine affairs in these waters; and also that a trained body of this class of men, of such spirit as they display, must of necessity be a valuable adjunct to the U. S. Navy in time of war.

We append to this report answers to certain questions propounded by the board.

Respectfully submitted.

L. C. BERTOLETTE,
Ensign, U. S. Navy.
CAREY B. MORGAN,
Ensign, U. S. Navy.
H. Y. YATES,
Ensign, U. S. Navy.

The COMMANDING OFFICER, U. S. S. MICHIGAN.

HEADQUARTERS FIRST DIVISION,
MICHIGAN STATE NAVAL BRIGADE,
Detroit, October 20, 1894.

SIR: Lieut. Wilkes has directed me to furnish you with certain information desired by the officers detailed to report on the work of the division during the recent drills on board the U. S. S. *Michigan*, and I have the honor to submit to you the following answers to your questions:

(1) *Date of organization officially.*—The division was mustered into the State service on February 28, 1894.

(2) *When was the organization practically effected?*—As soon as suitable quarters were secured, and about April 5, 1894, drills were begun.

(3) *Organized under what name?*—The official designation is the first division, Michigan State naval brigade. The State laws permit the incorporation of military companies, etc., for the better transaction of purely civil business, and the division has been incorporated under the name of the Detroit Naval Reserve. This civil organization is entirely outside of the military organization.

(4) *Number and rates allowed.*—The State law authorizes the formation of not to exceed eight divisions, of a maximum strength of not more than 80 and a minimum strength of not less than 40 enlisted men. Battalions may consist of not more than 4 nor less than 2 divisions. To each division are allowed, in addition to enlisted men, 1 lieutenant, 1 lieutenant (junior grade), and not more than 2 ensigns. The

allowance of petty officers and musicians to each division is prescribed by the commander-in-chief, and is fixed at present at not more than 2 musicians and not more than 13 petty officers, not more than 5 of whom shall be of the first or second classes and the remainder of the third class. The various rates within this limit are left to the discretion of the commanding officer.

(5) *Number and rates actually on the rolls.*—The rolls at present show the following strength:

Commissioned officers:		
Lieutenant	1	
Lieutenant (junior grade)	1	
Ensigns	2	
Total		4
Enlisted men:		
Boatswain's mate, first class	1	
Boatswain's mate, second class	1	
Gunner's mate, second class	1	
Quartermaster, second class	1	
Coxswains	4	
Gunner's mates, third class	2	
Quartermasters, third class	2	
Bugler	1	
Landsmen	62	
Total		75
Total		79

(6) *Plan of organization, whether gun crews, boat crews, infantry or artillery sections, or what.*—The divisional organizations are for purely administrative purposes, and when two or more divisions are acting together, may be wholly disregarded by the commanding officer. The basis of organization for shore duty, infantry or artillery, is the section of 2 petty officers and 16 men, as in the Navy. Further division of the men into watches, gun crews, and divisions, and for duty in various parts of the ship will be made as soon as practicable.

(7) *Uniforms of respective ranks and rates.*—The regulations prescribe that the uniform, insignia of corps, rank, grade, and duty, etc., for officers and men shall be the same as prescribed for the Navy, with a few minor exceptions, such as the cap device of commissioned officers, cap ribbon of enlisted men, etc. It is not intended or required that officers shall be required to be provided with any other uniform than the service dress, nor that enlisted men shall be provided with the white dress uniform.

(8) *How provided?*—At present provided by the organization from the funds raised by initiation fees, dues, etc. As soon as appropriations are available will be provided by the State.

(10) *What equipments are allowed.*—It is expected that the command will be equipped with the necessary equipments for service as infantry, artillery, or for duty on shipboard.

(11) *How provided?*—Partly by loans from the United States, partly by purchases with the State's share of the naval militia appropriation made by Congress, and it is expected that the remaining articles necessary will be provided by the State as soon as appropriation is available.

(12) *The class of men enrolled; occupations are desired.*—The men are drawn from citizens of the State within the ages of military duty (18 to 45 years), and the present members are drawn from among the best educated and most intelligent classes of the community. The occupations generally are those of lawyers, physicians, officers, or superintendents of manufacturing companies, clerks, etc. A number may be classed as capitalists or managers of estates.

(13) *How many have had any seafaring experience, and what?*—The commanding officer, Lieut. Wilkes, is a graduate of the Naval Academy and served for a number of years as an ensign in the Navy. One man has passed through the apprentice stage in the regular service and received honorable discharge. Of the remainder, none can be said to have had any seafaring experience professionally, though probably the greater portion of them have had a good deal of experience with yachts, both steam and sail, both on the lakes and salt water. I would say in this connection that the merchant vessels on the lakes are becoming more and more every year manned with a class of men of little or no seafaring experience or nautical education and who are more properly classed as longshoremen, rather than as sailors, and that it is believed that the class of men at present enlisted can be instructed so as

to be of service much more readily than the men who constitute the "seafaring" class on the lakes.

(*14*) *How many have had previous experience in the Navy as commissioned officers or enlisted men?*—One each, as stated above.

(*15*) *What system of drill and instruction has been followed since organization?*—The men have been drilled in infantry drill, the use of signals, knotting, splicing, etc., and other theoretical instruction, drills or instruction being held weekly. It has been impossible to instruct them as yet in artillery or boat drill, the guns and boats loaned to the State by the Department not having yet arrived, though promised a considerable time since.

(*16*) *What quarters have the division and where have the drills been conducted?*—The division have quarters in the largest and most complete of the State troops armories in the city. Drills have been conducted there and infantry drill on the streets as well. Upon the arrival of the cutters promised, they will be kept in accessible quarters near the river.

(*17*) *Do the members individually expect to enter. the U. S. naval service on the sea board; on the lakes; to serve the State of Michigan, or what?*—As far as this question can be answered, I will do so, though I can not do more than to say what has all along been set forth as the purpose of the organization and what I believe to be the individual expectations of the members. The command is a part of the active militia of the State, and as such is liable to be called into the State service for duty either ashore or afloat, at any time and for any length of time. Upon requisition by the President, they may be called into the service of the State and turned over to the service of the United States for duty within or without the State, either ashore or afloat. The members do not intend to enter the U. S. Navy, except in case of war, or when there would be need of their services, and, in such case, would expect to enlist for such time as their services would be needed or useful, to serve wherever required. They, of course, expect to serve the State when needed in common with the other forces of the national guard, and hope to equip themselves and attain such proficiency that in case of war they may be useful as a supplement to the regular forces of the Navy. None, so far as I know, have the slighest idea of regularly adopting the profession of arms, and the service is not intended as a training school for volunteer officers in case of war, but one for volunteer seamen.

(*18*) *State what, in the opinion of the officers, is the proficiency of the command in those drills they have had.*—Although the time for drill has been very limited, the men have been remarkably apt and quick in learning their duties. I have never seen volunteers learn more readily in the militia and they show a great desire to become as proficient as possible. They are exceedingly amenable to discipline and have none of the ideas often so fatal to such organizations, that the men are the equals of their officers on duty as well as when meeting in social or business intercourse. They perform the duties required of them without complaint or murmur, and, I believe, would serve in case of need, wherever required, without flinching or complaining.

I may say that it is our hope to attract to the State service young men for whom the other branches have no attractions, and who will in that way be fitted to serve the United States should the need arise for their services. I will also say that, for my part, and I believe I voice the opinions of my brother officers, I would much rather have the class of men at present in the service than any class of seafaring men to be found in the State, with the exception of men who have served in the Navy, as more intelligent and quicker to learn and much more amenable to discipline, and reliable.

All of which is respectfully submitted.

I have the honor to be, sir, your very obedient servant,

CYRUS E. LOTHROP,
Ensign, M. S. Naval Brigade.

Ensign L. C. BERTOLETTE, U. S. N.,
U. S. S. Michigan.

REPORT OF THE REPRESENTATIVE OF THE NAVY DEPARTMENT AT THE WORLD'S COLUMBIAN EXPOSITION AT CHICAGO.

WORLD'S COLUMBIAN EXPOSITION,
NAVY DEPARTMENT EXHIBIT,
1429 New York Avenue, Washington, D. C., April 21, 1894.

SIR: I have the honor to submit the following report of the Navy Department exhibit at the World's Columbian Exposition.

In accordance with section 16 of the act of Congress approved April 25, 1890 (Public, No. 81), making provision for the World's Columbian Exposition at Chicago in 1892, Captain, now Commodore, R. W. Meade, U. S. Navy, was named by the Secretary of the Navy as a member of the board of control and management, U. S. Government exhibit, to represent the Navy Department, July 19, 1890, and his appointment formally approved by the President August 19, 1890. The first regular meeting of the board was called for September 3, 1890.

On October 3, 1890, Commodore Meade presented to the board a plan of the proposed exhibit of the Navy in the following letter:

WASHINGTON, D. C., *October 10, 1890.*

Hon. EDWIN WILLITS and Members of the Board of Management, World's Columbian Exposition:

Mr. CHAIRMAN AND GENTLEMEN OF THE BOARD: As the representative of the Navy Department, and with its approval, I desire to lay before the board a plan in brief of the proposed exhibit of the Navy at the World's Columbian Exposition, to be held in Chicago, commencing May 1, 1893. This plan has been submitted to Mr. James H. Windrim, the Supervising Architect of the Treasury Department, who considers it both original in design and perfectly practicable of execution.

The plan is no other than to erect on the grounds of the Exposition a building which will perfectly simulate one of the three great battle ships recently authorized by Congress. The space actually required by the mere structure will be 348 feet long and 69¼ feet wide. The summit of the military or battle mast will tower 100 feet above the level on which the structure may be placed. The interior, which will closely resemble the actual ship, is to be utilized to exhibit everything that the Navy of the United States of 1893 may have of interest to show, not only in the way of actual outfit and equipment of modern battle ships, but also in the matter of models of ships of the present and past, together with the portraits of the heroes and worthies of the U. S. Navy from the Revolutionary period down to the present day. The work of the bureaus of the Department and its annexes will also be shown therein. In brief, that exhibit will present an epitome of the past and present of that arm of the public defense that I have the honor to represent. As an object lesson to our countrymen, especially those of the West, I think it will be conceded by you to be of great value.

The scheme, though novel and somewhat audacious, has received the unqualified approval of all experts competent to express an opinion. Nothing of the kind has ever been attempted before, I believe, at any world's fair, and as the plan, while unique, has the claim of not requiring an unusual expenditure of money, I trust it may receive the approval of my colleagues on this board.

The scheme partakes not only of the nature of a building, but also of an exhibit so intimately combined as to render it difficult to say where one begins and the other ceases.

It is proposed to construct the building of brick and coat it with a peculiar cement, so that when painted it will be next to impossible to distinguish it from metal, while the beams of iron or steel work of the interior will be actually such as are used in the warships of the day and available for such use if needed afterwards. The guns and all equipments will be, of course, such as are actually used in the

new Navy, and after the exposition is closed will be returned to the Navy Department authorities.

As under ordinary conditions a space of 20,000 square feet (approximately) would be required to present properly what the Navy has to show, I submit that from the building fund voted by Congress a suitable share of the money be allotted to the representative of the Navy Department to carry out the double plan of building and exhibit.

Plans and photographs are herewith submitted for the inspection of the board.

Very respectfully,

R. W. MEADE,
Captain, U. S. Navy.

Through the cooperation of the Bureau of Construction and Repair of the Navy Department, preliminary plans were immediately begun by Mr. F. W. Grogan and assistants.

December 17, 1890, I reported to Commodore Meade as his assistant and under his direction was placed in charge of all details connected with the exhibit. On account of illness, Commodore Meade was detached on May 16, 1893, when I was appointed as his successor. After consultation with the officials in Chicago and those in Washington, the actual location of the Navy Department exhibit—to be known as the model battle ship *Illinois*—was determined on to be in Lake Michigan near the shore. The local directory, in view of the probably limited appropriation to assure the building of this novel and interesting exhibit, so that the model should present the realistic effect of a vessel afloat, moored to a wharf, were induced to assume the cost of the pier built for the protection of the model battle ship against the seas which in easterly gales dash upon the lake front.

Upon the approval of Commodore Meade's plan, the Navy Department surrendered all exhibit space in the Government building, which enabled the other Departments to expand their exhibit space proportionately. For the Government building a separate appropriation of $400,000 was made.

Upon the recommendation of Commodore Meade, Mr. F. W. Grogan was appointed by the board as the architect of the naval exhibit and principal naval technical expert. His report, which accompanies this, gives the details of the construction of the Navy Department exhibit with plans and photographs.

Contracts approved by the board of management, by the Secretary of the Navy, and by the Secretary of the Treasury for building the model battle ship were awarded to the lowest bidders, after due advertisement in accordance with law. For the foundation, to H. B. Herr & Co., of Chicago, for $7,990; for the remainder of the structure to Charles W. Gindele, of Chicago, for $57,609. The range of bids for the entire structure was from $65,999 to $186,990. The work of the contractors was executed in a satisfactory manner, and the model battle ship presented a completed appearance upon the opening day of the Exposition.

The foundation was composed of piles and heavy timbers laid off to the shape of the battle ship, which was taken as a model. The hull of the structure was built upon this foundation; the sides of the hull of brick laid in cement, and covered outside and inside with Portland cement. Brick was used in the structure as the most economical material, with sufficient strength to bear the weight of the guns and the masses of people. The sides of the superstructure, redoubts, turrets, model guns, and bulkheads were made of wood framing, finished with Portland cement on metal lathing. All fittings and equipment were either exhibits furnished by the different bureaus of the Navy

Department or were modeled to conform to naval standards, making the entire structure an exhibit of the Navy Department.

The exhibit of the Bureau of Construction and Repair was best illustrated by the *Illinois* itself, supplemented by a complete outfit of boats, equipage, and stores, together with twenty models of vessels of the Navy and numerous handsome water colors of ships. Some of the latter were loaned by the William Cramp & Sons Ship Building and Engine Company, of Philadelphia, and by the Union Iron Works, of San Francisco.

The exhibit of the Bureau of Yards and Docks consisted of plans of the different naval stations, dry docks, ships, and other civil engineering works relating to the Navy. Both of these exhibits were installed by, and in charge of, Mr. F. W. Grogan.

The exhibit of the Bureau of Equipment consisted of a large number of articles, stores, and equipments required for the outfit of a man-of-war. In the main, the articles were of such size and number as would be required for a battle ship of the *Oregon* class. The electrical appliances were loaned by the General Electric Company, who, at their own expense, wired the model battleship and furnished the current for lighting and, as far as necessary, for power. The installation was made by Lieuts. Helm, Winterhalter, and Poundstone. During the latter part of the Exposition these exhibits were placed in charge of Pay Director Cosby, by whom they were repacked and reshipped.

Lieut. Winterhalter was detailed to install and take charge of the Naval Observatory exhibit, and I append his report for detailed information.

The three small buildings which contained the exhibit of the Naval Observatory were contracted for and built as public buildings by the Supervising Architect of the Treasury Department. To secure this, the representative of the Navy Department surrendered from the amount allotted to the Navy the sum of $1,500, which was transferred to a fund used for installation purposes in the Government Building.

The Naval Observatory exhibit consisted of time and chronometer services, the magnetic and astronomical exhibits, shown in a 40-foot building. Controlled clocks were hung and practical illustrations given of the working of the synchronizing mechanism by aid of a local battery and key. The chronograph was kept at work and its operations explained. The photoheliograph was in daily use. A time ball was placed on the Government Building by the Supervising Architect, upon plans furnished by Mr. W. F. Gardner of the Naval Observatory, and the installation completed on May 30, 1893. Time signals from the Naval Observatory in Washington were transmitted through the wires of the Western Union Telegraph Company at noon (Eastern standard time). The transmitter having been set to correct time as indicated by the Washington signal, the time ball was dropped at local noon (Central standard time). Clocks furnished by the Self-Winding Clock Company and by the Seth Thomas Clock Company were distributed in the Government Building and on the *Illinois*. These clocks were kept at correct time. Apparatus used in the inspection of nautical instruments was exhibited.

The small model observatory was visited by as many people as could be accommodated. Through the 5-inch equatorial 22,698 persons viewed the sun during the day, when counted during one month, and over 3,000 the heavens at night. The educational effects of the Naval Observatory exhibit were marked, and its success was mainly

due to the efficiency and constant attention of the officer in charge Lieut. A. C. Winterhalter, U. S. Navy.

The exhibit of the Bureau of Medicine and Surgery consisted of th medical outfit necessary for a complement of about five hundre officers and men. It was installed to present the appearance of a dispensary and sick bay of a battle ship. To permit the visitors t see the exhibit without inconvenience the inner bulkhead of the dis pensary was replaced by a railing. The exhibit was installed by, an during the Exposition was in charge of, Passed Assistant Surgeon A C. H. Russell, U. S. Navy, who also had the medical care of the officer and enlisted men and marines. The exhibit was a model of neatnes and technical completeness; the recommendations of Dr. Russell an his attention to his duty undoubtedly contributed largely to th unusually good health enjoyed by the entire naval complement durin their stay at Jackson Park.

The exhibit of the Bureau of Navigation consisted of the Hydrographi Office exhibit and of the Naval Academy exhibit, both installed by, an in charge of, Ensign George P. Blow, U. S. Navy. At the openin of the Exposition the Chicago branch Hydrographic Office w established and located in the wardroom country on the berth dec After July 24, 1893, the branch Hydrographic Office was withdraw and located permanently on the sixteenth floor of the Masonic Templ building in Chicago. The Hydrographic Office exhibited a most satis factory résumé of the important work of this office in chart construc tion, issue and supply of charts, sailing directions, and marine meter ology. Specimens of charts of different parts of the world, especially of such constructions from surveys made under the direction of the Hydrographic Office, were conspicuously displayed.

The exhibit of the Naval Academy was a model of thoroughness in showing the course of study, with specimens of work done by the naval cadets. The exhibit was prepared in accordance with directions of the Superintendent of the Naval Academy, Capt. R. L. Phythian, U. S Navy, by a committee of the academic board, Commander J. E. Craig U. S. Navy; Lieut. C. G. Bowman, U. S. Navy, and Prof. N. M. Terry

The Bureau of Ordnance exhibit was installed by, and in charge of Gunner John J. Walsh, U. S. Navy. Under his skillful and efficien supervision the exhibit was at all times kept in a most creditable con dition.

As it was impossible, with the means available, to build a structur that would support such heavy weights as real 13-inch and 8-incl breech-loading rifles, models of these guns were built up of wood, cov ered with cement worked over metal lathing, and shaped to the exac size of the exterior of the service guns. The battery of the *Illinois* con sisted of four 13-inch B. L. R.; eight 8-inch B. L. R.; four 6-inch B. L. R. fourteen 6-pounder Hotchkiss rapid-fire guns; six 6-pounder Driggs Schroeder rapid-fire guns; six 1-pounder Hotchkiss rapid-fire guns; on Hotchkiss 47-millimeter revolver cannon; one Hotchkiss 37-millimete revolver cannon; together with an outfit of small arms, such as maga zine rifles, revolvers, cutlasses, and single sticks. A sufficient suppl of ammunition was exhibited to show the character and variety of tha used in the service. The stowage of magazines was fully illustrated.

The 6-inch B. L. rifles, with carriages, deck circles, and sockets, wer shipped from the Washington navy-yard, September 14, 1893. The were fully installed by Mr. Walsh prior to the opening ceremonies i October. These guns comprised the first Government exhibit whiel arrived and was fully installed. In the forward torpedo room on th

berth deck was shown the exhibit of the torpedo station. Other exhibits of this station, such as the automobile and dirigible torpedoes and old types of torpedoes, together with old types of gun torpedoes and relics, were exhibited in different parts of the berth deck.

The exhibit of the Bureau of Steam Engineering was installed by, and in charge of, Passed Assistant Engineer F. M. Bennett, U. S. Navy, assisted by a detail of two machinists and four firemen from the U. S. S. *Michigan*. As the character of the structure made it impossible to install the engines and boilers of a battle ship, these important and necessary parts were shown by photographs, and the exhibit of the Bureau limited to the types of steam-launch boilers, engines, and engineering appliances. Had a sufficient appropriation been available, and the state of preparation of the new vessels permitted it, the recommendation of the Chief of Bureau to install the engines and boilers of one of the new vessels would have been a most desirable and instructive feature.

Various pieces of marine machinery were loaned by manufacturers, such as the Allen Dense Air Ice Machine, the Knowles Steam Pump Works, Mr. H. R. Worthington, and the Standard Thermometer Company of Peabody, Mass. The work in this exhibit was performed with skill and economy under Mr. Bennett's direction. Few who have not seen the types of engines and boilers now supplied to modern vessels of war can appreciate the immense power which it is now possible to develop in comparatively little space. This was especially illustrated by the drawing which showed on the same scale the engines of the *Powhatan* (1,172-horse power), built in 1849, and of the torpedo boat No. 2 (1,800-horse power), built in 1892.

The exhibit of the Bureau of Supplies and Accounts was installed by, and in charge of, Pay Director F. C. Cosby, U. S. Navy. The exhibit was necessarily limited to show the functions of the Bureau through the pay officer in subsisting and clothing the enlisted men of the Navy. For this purpose the issue room and the pay office were located on the main part of the berth deck, and mess lockers with complete outfits were placed on the forward part of the berth deck, designed as men's living quarters.

To Pay Director Cosby was also assigned all matters relating to the transportation of the Navy Department exhibit, either through the transportation officer of the Board or such as came directly to this office, and through his care and efficiency this important detail of the work has been most satisfactorily performed. Pay Director Cosby, as general storekeeper, was also responsible for the care of all Navy Department property on exhibit which was on official charge, amounting to more than $200,000.

The original plan of the representative of the Navy Department was made with the view of showing the life of a man-of-war through its personnel, but the limited number of enlisted men in the Navy prevented the Department from carrying out this part of the plan.

By direction of the Navy Department a detail of 20 enlisted men from the U. S. S. *Michigan*, in charge of Lieut. J. M. Helm, U. S. Navy, reported for duty March 28, 1893. I can not too highly commend the services of these men, who, regardless of weather or hours, heartily aided the officers in the installation of exhibits. The weather at this time was unusually severe, but work was willingly continued by them when no inducement could obtain ordinary paid labor. It was largely due to this detachment from the *Michigan* that the model battle ship presented a completed appearance on the opening day of the Exposition.

Prior to the arrival of the marines the enlisted men performed excellent service as guard to the exhibits, both night and day. Throughout the time they were employed in Jackson Park they were constantly employed in technical work for which they had been trained, and in keeping the model battle ship in a condition of model cleanliness. The limited number of laborers allowed for the Navy Department exhibit brought an unusual amount of work on the enlisted men. They remained on this duty with Lieut. Helm until all United States property had been removed and the *Illinois* had been transferred to the State of Illinois.

Lieut. Helm, in addition to his duties in charge of the detail from the *Michigan*, performed the main executive duties in connection with the *Illinois*. The care, cleanliness, and completeness of the model battle ship is in a great degree due to his zeal and efficiency. The Navy Department exhibit is much indebted to Lieutenant-Commander Berry, U. S. Navy, commanding the U. S. S. *Michigan*, who at all times rendered cordial assistance by detailing as many enlisted men as could possibly be spared from the vessel under his command.

The exhibit of the Marine Corps consisted of a detachment of 50 men, later increased to 60, under Capt. B. L. Russell, First Lieut. George Barnett, and Second Lieut. C. S. Radford. The marines arrived on May 6, 1893, and at once moved into the encampment "Camp Herbert," which had been prepared by Capt. R. S. Collum, assistant quartermaster, U. S. Marine Corps.

The duty of the marine guard consisted in guarding the naval exhibit on board the *Illinois*, the naval observatory, and the encampment, together with the exhibit of the State Department in the Government building. The guard was conspicuous at all times for its military bearing, good discipline, and efficiency. I take great pleasure in referring to the commendatory letters affixed to the report of Capt. Paul St. C. Murphy, who commanded the detachment after August 4, 1893. After the close of the Exposition the marine guard was gradually decreased in numbers, as their services could be dispensed with, the last detachment leaving when the *Illinois* was transferred to the State of Illinois, December 18, 1893.

The after redoubt of the berth deck was used as a museum, in which was exhibited paintings of naval officers who had received thanks from Congress. This series was incomplete, as many of our naval heroes were not represented. The other articles here exhibited consisted of relics and old arms. The international character of the Exposition induced the representative of the Navy Department to eliminate from the plan of the exhibit all trophies of war.

The catalogue of the Navy Department exhibit was compiled by Lieut. H. C. Poundstone, U. S. Navy. In this work he was assisted by the officers on duty, who in the main furnished the data of their respective bureaus. Lieut. Poundstone supplemented this by information gathered from many sources, and he carried on the compilation with such energy that, notwithstanding the limited time, the catalogue was ready on the opening day of the Exposition. A complete summary of the exhibit is best shown in the catalogue, a revised and corrected copy of which is appended as a part of this report.

The number of visitors to the Navy Department exhibit was computed from time to time. The daily attendance was over 20,000—that is, about 3,000 per hour—while the *Illinois* was open to the public. July 4 the attendance was over 50,000, and October 9 it was reported to me that 67,096 visitors crossed the gangway. Certainly more than 3,000,000

people visited the model battle ship during the hours it was open to the public—from 10:30 a. m. to 5:45 p. m., except Sundays, and, until September 1, from 8 to 10 p. m. After September 1 the ship was open to the public on two nights of the week—Wednesdays and Saturdays—from 7:30 to 9 p. m.

As this report may be referred to by officials of future expositions of our Government exhibits, I consider it proper to call attention to the injustice and hardships which were put upon the military and naval officers detailed for duty at the World's Columbian Exposition by reason of the interpretations of the statute laws made in their cases, and the omissions or restrictions of the Exposition appropriation acts concerning them. These interpretations, omissions, and restrictions have had the effect of depriving the commissioned officers of the Army, Navy, and Marine Corps of any allowances of any kind for subsistence or for any other extra living expenses to which they were necessarily subjected. While all other members of the Government board were allowed $5 a day for their actual expenses, the Army and Navy representatives were allowed nothing. They and the other Army and Navy officers on duty at the Exposition saw the enlisted men, mechanics, and civil employés of the Army and Navy, their own subordinates who were detailed for duty under them, receiving, in addition to their full regular pay, allowances of from $1 to $2.50 a day for their subsistence. Civilians who were first employed in other cities and then at Chicago during the Exposition, and to whom such allowances could not be given under the law, had their pay raised to meet their greater expenses, while employés first engaged at Chicago were paid at "Exposition prices." In short, the only persons to whom no consideration was shown in the matter of their expenses were the commissioned officers of the Army and Navy. In other expositions they were given the same allowances as other Government officials and employés, and it is to be hoped that in future expositions the appropriation acts will be so worded as to provide for their extra expenses, necessarily incurred, and to place them on an equal footing with others.

In presenting the financial statement it is proper to remark that the act of Congress forming the Board of Control and Management, U. S. Government exhibit, departed from the experience of the previous expositions in appropriating to the Board as a whole and not making specific appropriations to the several Departments to be represented. It is my belief that should Congress at any future time propose a Government exhibit, it would be advisable as a matter of economy that the appropriations should be specific to each Department. A separate appropriation for the common expenses of a board, together with a proviso authorizing the transfer of appropriations from one Department to another by common consent, would tend to efficiency, harmony, and economy.

Appropriation to the Board, general expenses	$939,000.00
14 per cent of above allotted to the Navy	131,460.00
Special appropriation by Congress	10,000.00
Total naval allotment	141,460.00
Amount deducted by action of the Board for common expenses, 5 per cent of $131,460	6,573.00
Installation fund (Naval Observatory)	1,500.00
	8,037.00
Available for specific expenses of the Navy Department exhibit	133,387.00

EXPENSES.

For contract of model battle ship:	
Foundation (H. B. Herr & Co.)	$7
Addition for iron tank	
Structure (C. W. Gindele)	57
Addition	4
Expenses of installation	10
preparation	2
transportation	8
maintenance	2
Unclassified expenditures	6
	12
Unexpendended balance, April 1, 1894	9
	13
Known outstanding liabilities	2
Available balance, April 21, 1894	7
	9

Very respectfully,

E. D. TAUSSIG,
Lieutenant-Commander, U. S. Navy,
Representing the Navy Department,
Board of Management, U. S. Government Ex

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

BOARD OF VISITORS TO THE U. S. NAVAL ACADEMY.

Gen. SCOTT SHIPP, Lexington, Va., *President.*
Hon. CHARLES S. RANDALL, House of Representatives, Massachusetts, *Vice-President.*
Hon. J. R. MCPHERSON, U. S. Senate, New Jersey.
Hon. GEORGE C. PERKINS, U. S. Senate, California.
Hon. ADOLPH MEYER, House of Representatives, Louisiana.
Hon. JOSEPH H. OUTHWAITE, House of Representatives, Ohio.
Mr. S. P. LANGLEY, Washington, D. C.
Mr. CHARLES H. WILLCOX, Atlanta, Ga.
The Venerable C. T. BRADY, Archdeacon of Kansas.
Mr. JOHN C. PEGRAM, Providence, R. I.
Gen. LEW WALLACE, Crawfordsville, Ind.
Mr. JOHN K. COWAN, Baltimore, Md.
C. W. BARTLETT, U. S. Navy, *Secretary.*

STANDING COMMITTEES.

1. *Conditions of admission to and discharge from the Academy.*—Hon. J. R. McPherson, Hon. Charles S. Randall, Mr. Charles H. Willcox.

2. *Subjects of study and standard of scholarship.*—Mr. John K. Cowan, Gen. Lew Wallace, Mr. S. P. Langley.

3. *Grounds, buildings, and sanitary condition.*—Hon. Adolph Meyer, Hon. Joseph Outhwaite, Hon. George C. Perkins, Hon. Charles S. Randall.

4. *Seamanship, ordnance, and navigation.*—Hon. George C. Perkins, Hon. Charles S. Randall, Mr. John C. Pegram, Archdeacon C. T. Brady.

5. *Discipline, drill, practical exercises, administration, and police.*—Mr. John C. Pegram, Archdeacon C. T. Brady, Mr. J. K. Cowan, Hon. Joseph H. Outhwaite.

6. *Steam, mathematics, physics, and mechanics.*—Mr. S. P. Langley, Mr. Charles H. Willcox, Mr. John C. Pegram.

7. *English studies, modern languages, drawing, physiology and hygiene.*—Archdeacon C. T. Brady, Hon. Adolph Meyer, Gen. Lew Wallace.

8. *Finance and library.*—Hon. Joseph H. Outhwaite, Mr. John K. Cowan, Hon. J. R. McPherson.

9. *Final report.*—Mr. Charles H. Willcox, Hon. Adolph Meyer, Hon. C. S. Randall, Gen. Scott Shipp.

REPORT

OF

THE BOARD OF VISITORS

TO THE

NAVAL ACADEMY, 1894.

ANNAPOLIS, MD., *June 8, 1894.*

The SECRETARY OF THE NAVY:

The Board of Visitors to the Naval Academy, at Annapolis, Md., respectfully submit the following recommendations:

(1) That the standard of admission be modified, and some branches upon which candidates are now examined be taught during the first year.

(2) Candidates to be admitted about June 1, and after admission to remain at the Academy during part of the summer.

(3) The cruise of naval cadets after four years' course at the Academy to be discontinued, and the entire cadet course (six years) to be at the Academy, and in practice ships connected with the Academy.

(4) The present four-years' course (without material additions in study) to spread over five years, with longer periods allotted to practice cruises, and more professional instruction.

(5) The third and fifth classes to have practical work at the Academy from May 22 to July 15; then to have leave until 5th October, two months and twenty days, and no leave to be granted to other classes.

(6) Four classes (first, second, fourth, and sixth) to make a four and a half months' practice cruise (June, July, August, and September, and eight days each in May and October).

(7) The practice ships to have a commanding officer, an executive, and two instructors, and the ships to be otherwise officered by cadets of the first and second classes, who will perform the duties of navigation (under the supervision of an instructor), and the duties of watch and division officers.

(The above are the recommendations of the Superintendent, unanimously indorsed.)

(8) It is recommended that the standard of age for admission to th Academy be hereafter not less than 15 nor more than 17 years.

(9) We further recommend that the present swordmaster, in view o his long and faithful service, be retired at the age of 62, with the pa of a retired boatswain.

(10) The Board submit to the Secretary of the Navy the propriety c his recommending at a time in the near future an appropriation b Congress for the construction of an edifice suitable for the deposit an display of the numerous trophies, now the property of the Navy, gatl ered in various places and said to be slowly going to waste and dus the place of the erection of the building to be left to the judgment Congress or of the Secretary.

(11) For further suggestions and recommendations we beg to ca your attention to the reports of the several committees appended, whic have been accepted and approved, and are hereby adopted as part c the report of the Board.

We can not compliment too highly the administration of the faithfu and efficient superintendent and officers of this naval academy, anc congratulate you and all of our fellow-countrymen upon having suck a great institution, in charge of competent gentlemen, who, in addition to training our young men to be of practical service to their Govern ment, are inculcating in them those principles which stamp the char acter of true American manhood.

SCOTT SHIPP,
President.

CHAS. S. RANDALL,
Vice-President.

AD. MEYER, M. C.
JOS. H. OUTHWAITE, M. C.
LEW. WALLACE.
JOHN C. PEGRAM.
JOHN K. COWAN.
CYRUS TOWNSEND BRADY.
GEO. C. PERKINS, U. S. S.
J. R. MCPHERSON, U. S. S.
S. P. LANGLEY.
CHARLES H. WILLCOX,
Chairman of Committee on Final Report.

APPENDIX.

REPORT OF THE COMMITTEE ON SUBJECTS OF STUDY AND STANDARD OF SCHOLARSHIP.

The committee on subjects of study and standard of scholarship have the honor to report that the subjects of study are in part scientific and in part technical. The first category embraces these branches of science: Mathematics, physics and chemistry, mechanics and astronomy that constitute the essential basis of the technical courses of navigation, ordnance and gunnery, steam and electrical engineering. The standard of scholarship is necessarily determined by the time that is devoted to each subject, and seems to have been adjusted with wise discretion. It is the judgment of the committee that, in view of the insufficient preparation of young men who enter the academy, the time devoted to master these subjects is inadequate.

Should the two years now devoted to sea service be spent at the academy, in accordance with the recommendation of the superintendent, approved by this board, this objection will be obviated, increased thoroughness of instruction will be secured, and the standard of scholarship will be elevated.

REPORT OF THE COMMITTEE ON GROUNDS, BUILDINGS, AND SANITARY CONDITIONS.

The grounds are well kept and preserved in the beauty and artistic methods that have always characterized them.

The condition of the buildings, with the exceptions that will hereafter be mentioned, is good and satisfactory. The cadet quarters are clean, and every department pertaining thereto receives the most studious care and attention.

The following repairs and improvements are especially recommended: Extension of sea wall on north front and filling in space thus inclosed; extension of sea wall on east front from angle in wall to inner end of DuBoise wharf; bulkheading Hanover street side from present end of wall to same wharf and filling in; building sea wall at Ferry wharf; removal of hill and grading on new grounds. Ten thousand dollars for a portion of this work is included in the naval appropriation bill now before the Senate, but the work will require the additional sum of $10,000. Raising sea wall around Academy grounds sufficiently high to prevent overflow by high tides; estimated cost, $15,000. Raising sea wall around naval cemetery and hospital grounds and filling in to grade; estimated cost, $10,000. The urgent and great necessity for this was shown during this year on three occasions, when the lower portion of the grounds was covered with water and floating débris, fires were put out in the gas plant and lower retorts cracked, lower flooring of carpenters' and masons' shops and boathouse floated. The sills of the new boiler house on this occasion were raised 18 inches above grade, but the last flood was 4 inches above the sills. Roads are washed out with every high tide and storm combined, and the undermining of the sea wall has become a very serious matter.

The gas plant, entirely inadequate for the needs of the institution, now consist of 2 benches of 5's, was built thirty years ago, and was so badly damaged by recent floods that its collapse may occur at any moment. An electric-light plant should be substituted. Repairs to gas plant, building 2 benches of 6's, and erecting roof over same and purifying room would involve an expense of $5,000. The committee recommends an electric-light plant, 3 dynamos similar to those on the U. S. S. *New York*, with 2 high-pressure marine boilers of the latest type now used in the Navy, wiring by underground system, and completing the insulation in every respect.

In putting in this plant it is deemed advisable to use the same dynamos, boilers, etc., now in use, or contracted for, in the new ships, thus making it useful for instructional purposes, theoretical as well as practical.

Attention is called to the dilapidated condition of the shed of the Standish wharf used for a boathouse, coal shed, car shed, stable, and storage rooms for engineering, carpentering, and masons' supplies. These as well as the wharf can not stand much longer, and it is requested that a storehouse suitable for the requirements of this institution should be built, that the stores, etc., therein may receive the care and protection demanded by the best interests of the Government. It is now impossible to house and put under lock and key supplies which should be better protected.

We recommend also the rebuilding of the Standish wharf, now in very bad condition, and carrying out suction pipes for salt-water system to deep water.

At the present time the end of this pipe, which supplies the salt water for the water-closet and sewerage system, is in too close proximity to the ends of the main sewers of the yard.

Attention is also called to the carpenter, paint, and masons' shops, all crowded into an old building entirely unsuited for the purpose, and of capacity sufficient for but one of the trades named. This building could be remodeled, lower floors raised above high-water mark, and could be used for the masons or painters. Provision should then be made for the other trades. In the interests of economy the fitting up of the carpenter shop with woodworking machinery is earnestly recommended.

The recommendations of the Board of Visitors of 1892 and 1893 regarding additional quarters for the younger officers, the staking out of cemetery lots, walks, etc., with permanent stones, building necessary storehouses, grouping of buildings in accordance with general plan to be formulated by a commission appointed by the Secretary of the Navy, a better boathouse and equipment of boats, an increased water supply, are again brought forward for consideration.

The condition of the naval hospital on the farm has not improved during the past year. As there is no appropriation for the repair of this building it is fast falling down. The main porches should be pulled down to avoid accident to the janitor and visitors.

An estimate was made to put the building in such repair that it could be used for quarters for junior officers. Twenty thousand dollars would make it habitable in its present shape, but a greater amount would be required to divide it up into suitable quarters for families and the latter plan is suggested as the most useful. The small additional cost of an electric road and car would make this project feasible, and make this building of great use to this institution. Gas or electric light and steam could be furnished from the plants at the U. S. Naval Academy. If nothing else should be deemed advisable, the main roof should be replaced and such glazing and painting done as to stop its further deterioration.

The water supply is inadequate and it will be necessary to take steps toward an additional supply from artesian wells or from some other source. It is estimated that the cost of a complete plant for independent water supply would not largely, if at all, exceed water dues for one year as now paid.

The closet system should be reconstructed, and the best sanitary appliances in the country be substituted for the old and faulty system now in use. This has been consistently urged by every Board of Visitors during recent years and should not be longer delayed.

REPORT OF THE COMMITTEE ON SEAMANSHIP, ORDNANCE, AND NAVIGATION.

Your committee respectfully reports that in regard to the subject of seamanship, it begs to indorse and adopt the views expressed in the report of the committee on drills, practical exercises, etc., and especially its recommendation that the Department furnish to the Academy every available material for promoting the exercise of practical seamanship aloft and afloat in sailing vessels of the Navy.

As to ordnance, the committee can not express too strongly its appreciation of the thoroughness with which the cadets appear to be instructed and trained, both in theory and practice. The target practice afloat in the *Bancroft*, with modern guns, was exceptionally accurate and the batteries handled with evident familiarity and proficiency. The exercises with fieldpieces likewise showed careful training and thorough knowledge of the drill, and, in fact, all branches of ordnance, both as a science and an art, have manifestly received careful supervision on the part of the instructors and intelligent attention upon that of the cadets.

The department of ordnance appears to be well equipped for all the present wants of the Academy.

The committee has had no time to make an exhaustive investigation of this subject of navigation, but it has seen enough to lead to the opinion that the former standard of excellence in this department has been fully maintained.

REPORT OF THE COMMITTEE ON DRILL, DISCIPLINE, PRACTICAL EXERCISES, ETC.

Your committee begs leave to report that it has carefully observed the various drills and practical exercises of the different classes exhibited during the week and is much impressed by the wide scope of the physical and military training of the cadets, as well as the thorough manner in which they are instructed therein. With so wide and diversified a curriculum of such training and instructions as is called for during the limited residence of the cadets at the Academy, it is hardly less than surprising to find such a high degree of excellence in most of them, especially considering the great demands upon their time for mental training and study. Perhaps the only criticism called for in this connection is the lack of manual dexterity and possibly of serious interest in practical seamanship. This is, however, easily explained by the very limited opportunities for exercises aloft on board of vessels of a bygone type. While these defects will doubtless be largely remedied by the approaching practice cruise, it is the opinion of the committee that every facility should be enjoyed while at the Academy for exercise and training of this character.

Although the type of man-of-war represented by the frigate and sloop of war of the last generation is apparently obsolete, the qualities of dexterous and ready seamanship can never be superfluous in a naval officer, and these qualities can best be acquired in such vessels. The *Bancroft*, a recent acquisition to the Academy, answers admirably the demands for giving practice in the modern sense, as well as drills under steam. The committee would strongly recommend that these facilities for practice afloat be supplemented by one or two small square-rigged sailing vessels, kept constantly ready for such service at the Naval Academy. It should never be lost sight of that the cadet is in training to be a sea officer and not merely a scientific mechanical engineer, and no available means should be kept unemployed to promote and facilitate such training.

Considering the limited opportunities for observing the actual state of discipline enjoyed by the committee, any judgment thereupon must be more or less superficial, but from such observation, aided by inquiries among the different officers, whose duties here fit them to give intelligent opinions upon the subject, the committee is led to believe that the administration has maintained the excellent state of discipline

among the cadets which has characterized the school for many years. It is believe however, that an improvement may be expected in this respect, if the imports changes of administration recommended by the Superintendent shall be adopt so soon as such changes shall have had time and opportunity to show results.

On the whole your committee, in reporting upon the special subjects referred it, feel constrained to express a very high degree of satisfaction with the standi of the school in the essential features of drill, discipline, physical exercise, admir tration, and police.

REPORT OF THE COMMITTEE ON STEAM, MATHEMATICS, PHYSICS, A CHEMISTRY.

(1) In the matter of steam a communication in writing from the head of the dep ment as to the need of further accommodation for housing the plant and assembl the cadets is herewith submitted, marked A. In the recommendations therein m the committee, after conference with the officers of the department and an exa nation of the subject, concur.

As to the further communication from the head of that department, marked B, committee feels that the information contained therein, while demonstrating small measure of time allotted to practical exercises in this important branch, n be more intelligently considered by the academic board, in the event of the ad tion of the Superintendent's recommendation (indorsed by the Board of Visito when rearranging the subjects conformably to an increase in the length of academic course.

(2) In physics, mathematics, and applied mathematics your committee found admirable system of instruction and of determining the relative excellence of cadets, and these branches appeared to be well equipped with the material neces for efficient teaching. It is the opinion of a majority of the committee, howe that better results might be obtained in an exact science like mathematics if instructors, other than the head of the department, were permanently trai teachers from civil life, rather than line officers of the Navy, changed from tim time.

(3) In the department of physics, while the equipment of the laboratory v instruments and other material for instruction is quite complete, it is thou that a great desideratum would be met by a moderate extension of the pre building, so as to furnish space under the same roof for physical experiments.

A.

DEPARTMENT OF STEAM ENGINEERING, U. S. NAVAL ACADEMY,
Annapolis, Md., June 6, 18

DEAR SIR: At the request of the committee of which you are chairman I h the honor to submit the following memorandum of the changes which, in my opin are necessary to be made in this department in order to put it in condition for better training of the naval cadets in the practical duties of their profession, i far as those duties relate to the mechanical arts.

First. The enlargement of the building of the department in order to pro room for the suggested changes. At present the machine shop is overcrow while necessary power tools are still lacking; the boiler shop is such only in na there is no foundry, although a small crucible furnace has been built in the bl smith shop. A cupola furnace, a flanging forge, a brazing forge, and the neces machinery to work them, blowing engines, etc., which were sent here two years by the Bureau of Steam Engineering, have never been erected on account of of room. Valuable instruction could be given were this plant suitably housed. addition to the instruction much repairing work to the vessels of the station, w is now impossible, could be done here.

(1) A room for designing is absolutely necessary. During the last year the engineer division has been crowded into a room ill adapted for the purpose both as regards space and light.

(2) The marine engine, which is now in the building, and which is of an obsolete type, to be replaced by a vertical triple or quadruple expansion marine engine of about 3,000 I. H. P., with the necessary modern boilers and auxiliary machinery, as now fitted in men of war of the present day.

(3) The machine shop to be enlarged by the addition of 25 power tools, to be selected, all of the most modern type.

(4) The pattern shop to be suppiled with 10-power turning lathes.

(5) The boiler shop to be enlarged and fitted with the necessary punching, shearing, and riveting machines.

An officer to be thoroughly efficient in the management and care of a modern war ship must possess more than a mere smattering of the arts necessary to accomplish that end, and here is where that portion of his education is obtained. The appliances used, therefore, should be of the most modern design, as there is no time to waste, to say nothing of the folly of such a course, in teaching obsolete methods and practices.

With the above suggested changes better instruction could be imparted and much valuable time saved in which to increase the range and scope of the instruction given.

The cost to the Government of a proper plant here would be as nothing compared to the ultimate saving in the better care which would be taken of the costly implements of warfare placed in the charge of its future officers.

Very respectfully,

C. W. RAE,

Chief Engineer, U. S. Navy, Head of Department of Steam Engineering.

Prof. S. P. LANGLEY,

Chairman Committee on Steam Mathematics, etc.

B.

U. S. NAVAL ACADEMY,
Annapolis, Md., June 6, 1894.

DEAR SIR: Agreeably to your verbal request, I have the honor to submit the following information in regard to the time spent in practical exercises in the Department of Steam Engineering by the naval cadets of both line and engineer divisions, during their four year's course at this school, viz:

As second classmen.—Summer: 24 days of 4 hours, 96 hours; 12 days of 1.5 hours, 18 hours. Winter: 30 days of 1.25 hours, 37 5 hours. Total, 151.5 hours.

As first classmen.—Line division: Winter, 15 days of 1.25 hours, 18.75 hours. Engineer division; summer: 24 days of 4 hours, 96 hours; 20 days of 1.5 hours, 30 hours. Winter: 160 days of 1.25 hours, 200 hours. Total, 326 hours.

Recapitulation.—Line cadets: Hours, 170.25; days of 8 hours, 21 (nearly); weeks of 48 hours, 3.5 (nearly). Engineer cadets: Hours, 477.5; days of 8 hours, 60 (nearly); weeks of 48 hours, 10 (nearly).

Very respectfully,

C. W. RAE,

Chief Engineer, U. S. Navy, Head of Department of Steam Engineering.

Prof. S. P. LANGLEY,

Chairman of Committee on Steam, Mathematics, etc.

REPORT OF THE COMMITTEE ON ENGLISH STUDIES, MODERN LANGUAGES, DRAWING, PHYSIOLOGY, AND HYGIENE.

In the limited time at our disposal we have endeavored to inspect the several departments as thoroughly as possible. We find the usual high standard of efficiency and thoroughness of instruction has been maintained with the usual good results. In connection with the department of English we desire to call attention to the value of cooperation by officers of other departments with the department of English in the matter of teaching the cadets to use the English language with facility and precision. It is our opinion that this cooperation may be made most effective by continual correction of errors in diction, pronunciation, and grammar, whenever they occur in recitations, drills, or elsewhere, and by reporting the errors regularly to the English department. In this connection we desire to express our appreciation of the system in vogue in the department for the correction of errors in diction, spelling, etc., as thoroughly simple and effectual.

In connection with the department of modern languages we find the time allotted the cadets in this department is so limited that it is impossible to expect a high degree of proficiency from them.

Further, in view of the growing importance of our relations with the Spanish-speaking people, and noting that almost the only diplomatic incidents of note in recent years in which the United States has participated have been with them, and that our naval officers have been especially useful in these contingencies, the committee desires to emphatically express its opinion of the necessity of making the study of Spanish compulsory, taking for the purpose of teaching it some of the time heretofore devoted to the study of French. The following division of time is suggested: First term, first year, French alone; after that the remaining time allotted the department to be divided equally between Spanish and French. As the conversational method of instruction is used, we are of the opinion that more instructors are required, so that no instructor should hear more than 6 cadets for one recitation.

In the department of drawing the committee was especially pleased with the proficiency exhibited and can see nothing which calls for any recommendation.

In the department of physiology and hygiene the evidence of systematic and careful instruction and practice in setting-up exercise, calisthenics, fencing, boxing, etc., impressed us most favorably, and we find nothing further to recommend in this direction. We are also much pleased at the fine physical condition of the cadets generally, and we think it advisable to stimulate and develop the athletic spirit which has evidently so benefited the cadets by a judicious recognition, within proper limits, of amateur athletics and contests of skill and endurance with young men from other similar institutions and colleges in the land.

REPORT OF THE COMMITTEE ON FINANCE AND LIBRARY.

In the brief time allowed to this committee it has examined, as far as possible, the system of orders, inspection of purchases, and expenditures, certificates, and vouchers adopted and used at the Academy. The books of accounts have been freely opened to our inspection. Strict economy and accuracy in the accounts are clearly manifest in the fiscal transactions of each year. The appropriations heretofore made for the support of this Academy have been expended with care, intelligence, and good judgment.

There are now in the library 33,848 volumes, and it is essentially a working library, since bibliographical rarities and curiosities are avoided in making out the purchase lists and only a small quantity of fiction is bought.

The policy of purchase seems to be to buy everything relating to the condition and development of the navies of the United States, Great Britain, and France,

then the standard new publications on the subjects of mathematics, history, biography, travel, and some books in foreign languages.

The chief engineering and technical journals are taken and the volumes bound and kept in the library. As there is no endowment fund and gifts are very few, the library has been built up wholly from the annual Congressional appropriation of $2,000. While more money might be easily and advantageously used, this amount enables the library to keep in touch with the chief standard publications.

The most urgent need is a removal of the legal restriction on the quality of binding and repairing. At present no book can be rebound in morroco or half morroco, but no matter how valuable it may be nor how other volumes of the set may have been bound, it must be put in cloth or half-sheep binding, both of which are cheap and unserviceable.

It is economy in any library to use a good binding, because it lengthens the life of a book; and a slight saving in the beginning often occasions future expense and loss. The reason for the restriction in binding is a statute that all binding for the Departments of the Government must be done in the Government Printing Office, and, further, that only cloth or half-sheep binding shall be done. Certain libraries have at various times been excepted from the provisions of this law until there are five libraries that are not restricted in the quality of the binding done for them in the Government Printing Office, and it is of great importance that this library should be given the same freedom.

This recommendation was made by the last Board of Visitors, and we emphatically repeat it. The next need is that there should be an appropriation for the rebinding and repairs of the books of the library. This is an annual and increasing charge, and has heretofore been paid out of the appropriation for printing and binding for the Navy Department. It frequently happens that so many demands are made on that appropriation that no money is available for this rebinding, and the result is that the volumes of professional, technical, and engineering journals accumulate for two years before being bound—an event which cripples the active service and usefulness of the library. To relieve this we would recommend a separate annual appropriation of $1,000 for binding and repairing the books of this library. Then the volumes of scientific journals could be bound when ready and the library thus kept up to date.

Another, though less urgent, need is some provision for the future housing of the library.

The day is not far distant when the present shelf space will be all occupied. Indeed, were the attempt now made to arrange a complete set of public documents, many of which are packed away, every foot of available space would be used. The present building is not fireproof, and open fires are maintained in the upper story in the winter. The collection of books has reached a size and value to demand proper care, so it seems as if it would be well to begin the consideration of a well-equipped fireproof library building. It should be designed so as to admit of future extension, and only a part need be built at first.

It would be most fitting and appropriate if it could be given a little additional architectural elegance and ornament, that it might serve as a monument and memorial to the late George Bancroft, historian of the United States and the founder of the Naval Academy.

ARGUMENT OF THE SUPERINTENDENT IN SUPPORT OF HIS RECOMMENDATIONS.

(1) Reduction of Standard of Admission.

The reasons for this recommendation, briefly stated, are:

The change will guarantee strict justice to candidates who have not had fair facilities for preparation, and will give to representatives of all sections of the country equal chances for admission. It will break up the pernicious system of

"cramming" for a special examination, by means of which many comparatively stupid boys, with but a superficial knowledge of the several branches, gain admission into the Academy, and for lack of which many naturally intelligent boys whose opportunities have been limited are rejected. The subjects, or parts of subjects, omitted from the examination for admission as now prescribed will be taught during the first year, so that proficiency in them will be assured, and will be determined by the student's progress under the system of instruction pursued at the Academy. The poorest cadets will then be dropped and the best retained, after an intelligent weighing of their capabilities, not after an examination, the result of which depends largely upon chance, and which does not show the real proficiency of the candidate. Thus the Government will eventually secure the best of the material that is presented, and strict justice will be done to worthy and intelligent youths who come from sections of the country in which educational facilities are limited.

(2) CANDIDATES ADMITTED JUNE 1, ETC.

At this date the practice ships will have sailed, and the admission of candidates will not interfere with the annual examinations. As there will be but few rejections, chiefly from physical defects, twenty days will give ample time for the reporting of alternates, who should be named by members of Congress at the same time they nominate principals.

The accidental leaving of the fourth class here during the summer of 1890 furnished the opportunity to show that the time may be most usefully spent. The fourth class of cadets of that year had instruction and exercises which prepared them to be classed with older cadets in drills, formations, etc., at the beginning of the academic year. They also had valuable experience in boats under sail and oars, and practical exercises in handling the sails of the *Wyoming*, which could not have been given to them on board the practice ship, where, necessarily, the instruction is principally for the benefit of the higher classes.

(3) DISCONTINUING CADET COURSE IN GENERAL-SERVICE SHIPS.

It is the opinion of many commanding and other officers of the Navy that the two years of so-called probation at sea, after leaving the Academy, is practically a waste of time, and not a few regard it as actually injurious to the cadet and to the service.

Graduated from Annapolis with an academic education of high order, but with a very limited experience in the practical part of his profession, the cadet is out of place while performing duty as an officer on board a ship of war in general service. He feels that he has upon him the responsibilities of an officer; that he is to perform the duties of an officer, yet he is not fully prepared for the intelligent performance of many of these duties. His superiors are too apt to exact from him service that he should not be expected to perform, and his inferiors look to him for instruction and orders which he is not fully competent to give. Soon the superior comes to unjustly underrate him; soon the inferior begins to lose proper respect for him. All this arises from the fact that the cadet upon leaving the Academy ceases to regard himself as still a student on probation, and he is not so regarded by others. He assumes to do more than he can accomplish, and duties and responsibilities are imposed upon him which his superiors should not, in reason, expect him to fulfill.

These evils will take shape the instant the cadet is removed—before the completion of his education—from the sphere in which he regards himself and is considered by others as a student, and they will continue so long as the cadet—who is still an undergraduate—is called upon to perform duty as an officer on board ship. No regulation of the Department, however carefully worded, no order, however stringent, can prevent this state of affairs, simply because it comes directly from *natural* causes.

The only remedy is to recognize that it is impossible to combine with good results the officer and the student; to keep the student within the proper sphere of the student until he shall be competent to perform the duties of the officer; and to send the graduate of the Naval Academy into general service, commissioned as an ensign, qualified for all of the duties of a watch and division officer.

It is believed that this can be done in six years of student life, with a judicious employment of the time.

(4). DISTRIBUTING THE COURSE OVER A LONGER PERIOD.

The purpose of this recommendation is to allow sufficient time for the present course, and still to give to the student adequate rest for his brain—to the boy intervals long enough to enable him to enter into boyish pursuits, and more important still, to provide for more professional instruction and practical exercise. The alternative, viz, an abridgment of the present course is not to be thought of. When it is considered how wide is the scope of professional requirements, how necessary is the groundwork for future investigation, it would be difficult to say what branch can be dropped. An examination of the curriculum will show that no study now pursued should be dispensed with, and that the time allotted to each is barely adequate.

(5) LEAVE TO BUT TWO CLASSES EACH SUMMER.

I am thoroughly convinced that the short annual leave now granted to all classes is demoralizing to the cadets. Its influence is felt for weeks after the opening of the school and it is a great tax upon their limited pay. Worse still, the practice cruises are so shortened as to make them of very little advantage; for it is during the last part of a cruise that the best results are accomplished. During recent years the cadets have just begun to get into the way of acquiring useful knowledge when the cruise comes to an end. Besides, with the prospect of leave before them, their thoughts are diverted from their duties by the anticipation of it. By this change but two classes each year will return from leave at the opening of the school. The leave will be long enough to satisfy them and I believe that a long leave is less demoralizing than a short one. The cadets return from it satiated with inaction and anxious to begin work; whereas, after a short, unsatisfactory leave, their minds are filled with the contemplation of pleasures cut short.

(6, 7) PRACTICE CRUISES.

The purpose of this institution being to educate young men for the naval service, certainly too much attention can not be paid to instruction in those things which go to make the officer. It is an acknowledged fact that the short broken cruises made by cadets do not produce satisfactory results. Not only is the time too limited to give them the requisite practice, but they do not in early cruises acquire sufficient knowledge to enable them to appreciate the higher instruction attempted during their last cruise.

By the plan proposed, the experience during the nine months of the first and second cruises, together with instruction which, with a prolonged cruise, can be given at the Academy, will fit the cadets for the intelligent performance of the minor duties of an officer, and these duties will be performed during the third cruise, under the supervision of officers qualified to correct and guide them, so that, when they come to the final cruise, they will be prepared to undertake the full duties of watch and division officers; still, however, under intelligent supervision when necessary.

This final cruise in a ship devoted solely to instruction, in which no faults or mistakes will be allowed to pass unnoticed—in which every working hour will be given to teaching and training—will be of vastly more benefit than the whole two years of cadet life on board a general-service vessel, with two or three years of after

service as ensign added to them. It will fit cadets to receive commissions of ensign and will qualify them for the performance of the duties of even a higher grade.

It is not contemplated that instruction and practice during these cruises, and in exercises at the Academy, shall be limited to the performance of evolutions. The officers of the ships and Academy will be watchful that not the slightest detail of etiquette in naval courtesies is overlooked, not the slightest infringement of regulations allowed; manner, tone of voice, and general bearing will be closely observed, and defects, if remediable, will be corrected; the strictest attention to all duties, however small, will be required; habits of observation will be cultivated. The all-important matter of treatment of subordinates will receive the consideration it deserves. It will be impressed upon cadets that they should be firm, but not overbearing; that the language used to men should be plain and direct, but not offensive; that the promptest obedience should be exacted, but without tyranny; in fine, that they should so conduct themselves as to command respect and cheerful obedience from those placed under them, through their own officer-like qualities.

These considerations lead up to a matter which is worthy of careful consideration. The most common criticism of the Academy is that not enough attention is paid to professional subjects, and not enough weight given in assigning standing to officer-like qualities and aptitude for the naval service. This criticism is too just, but no remedy can be found except in increased facilities for teaching and observing.

The importance of each and every branch of study pursued at the Academy, the necessity of all to the complete education of the naval officer of the present day, preclude the consideration for one moment of a proposition to dispense with any of them, even for the purpose of adding purely professional instruction, so that it is impossible under the present system to remove this reflection upon the results attained here. Nor is there any way under present conditions to escape the justice of the second part of the criticism. The intercourse between officers of the Academy and cadets under circumstances which would enable the former to judge of the aptitude for the service and professional acquirements of the latter is now so limited that a satisfactory comparison of cadets one with another can not be made.

The reports from commanding officers of cruising ships are, as a whole, absolutely without value in determining the relative standing of a class. The dozen or more captains under whom cadets are serving differ widely in temperament, in modes of conducting duty, in their estimate of what constitutes officer-like qualities, and in their understanding of the degree expressed by such words as "excellent," "good," "fair." What one would report as "fair" another would call "good," and a third "very good;" so that the reports of several cadets in one ship are in no sense comparable with the reports of an equal number serving on board another ship.

These reports, too, are misleading and likely to cause injustice, for an average cadet serving with an easy-going captain is liable to be classed as "excellent," while a superior one under the command of a strict officer, who carefully weighs the meaning of words, will be reported only as "good." Upon these two reports is based the comparative worth of two cadets, and the better man is placed below the poorer. So it happens that even the limited weight now given to professional acquirements is as apt to lead to injustice. But this should not be so. Means should be devised to weigh an entire class in these important qualities, so that they can be intelligently graded and the best officers (outside of academic standing) found at the head and the poorest at the foot of the list. Then, in combining all acquirements, academic and professional, great weight should be given to aptitude for the service, and officer-like qualities so great that cadets conspicuous for them would, in the general standing, surely come within the number to be admitted into the service. Such a classification is not attainable under the existing distribution of cadet service, but there is no doubt that it would be easy of accomplishment if the entire six years of the course, eighteen months of which would be on board practice ships, were passed under the officers of the Academy. This consideration alone

affords a strong argument for the proposed change. Before closing I beg to say that not one word of the above is intended as a reflection upon the administration of the Academy, nor upon commanders of cruising vessels who make reports of cadets. The defects which I have endeavored to point out are not the consequences of faulty or careless administration. They arise chiefly from the addition, year by year, of new and important branches of study introduced into the establishment of the four-years' course, the effect of which has been to crowd more into the course now than can be well accomplished in the time, and they could not have been avoided by the most judicious management. Nor do I mean to intimate that the Academy, even with these defects, has not produced excellent results. It has; it has given to the naval service a corps of officers who are justly regarded as the equals, if not the superiors, of the members of any naval service in the world, and it will continue to do so.

I fully recognize that the work has been good, but, being convinced that better can be done, I am urging changes that will bring about such a desirable result.

To sum up briefly, it is claimed that the adoption of these suggestions will produce the following results:

(1) Strict justice to youths from every part of the country by giving all equal chances for admission into the Academy.

(2) The thorough grounding of students at the Academy in elementary branches, which is not secured by a high standard of admission.

(3) Eventually obtaining for the service the best of the material presented.

(4) The prevention of the baneful effects of short annual leaves, and at the same time the granting leaves of satisfactory length.

(5) The more thorough teaching of the present academic course and the introduction of new professional matter.

(6) Practice cruises of sufficient length to enable theoretical instruction to be properly supplemented by practical application.

(7) Inculcating habits of strict attention to duty, and that proper observance of naval etiquette which is so essential in a well ordered man-of-war.

(8) Practical experience in the performance of the duties of an officer, under the most favorable conditions, by which the cadet will be qualified, upon graduation, to perform these duties in general service ships.

(9) (And perhaps the most important of all,) the means of forming correct estimates of the professional qualities of cadets and their aptitude for the naval service whereby these may have great weight in selecting the graduates who are to become the officers of the Navy.

ADDRESS OF GEN. LEW WALLACE TO THE GRADUATING CLASS, NAVAL CADETS, 1894.

GENTLEMEN OF THE ACADEMY: The Board of Visitors, of which I have the honor to be a member, are unwilling, after witnessing your many varied and excellent performances, to separate without a direct expression of the interest you have excited in them. They have, therefore, selected me to speak in their behalf as well as my own.

Let me begin, gentlemen, with a confession. I am not unconscious of my years. Their weight is upon me; yet I remember the days of my youth, when the making of life was my most sacred privilege. And looking backward now, I tell you soberly there is nothing in life so beautiful as manly youth. A sound philosophy forbids me envying you its possession; at the same time, did I envy you, there would be much reason for it. Speaking representatively, I am more than your friend, more than your comrade. I am your lover, and loving you is but loving our country.

I said did I envy you there would be much reason in the envy. Do not treat the utterance too lightly. Do not dismiss it as an idle compliment. Hear me first. Supposing distinction your ultimate aim, it is not in these days enough that you are favored with health, strength, education, and all the physical and mental graces of which superiority is compounded. No man ever was, no man ever will be, great, except he have opportunities to manifest himself. Here is why you move me so greatly: When you pass out the door yonder look up thankfully, then look down and be glad, for at your feet there begins a road lined with opportunities exclusively yours; and I caution you so thickly will that road be found strewn with opportunities that if you run your races undistinguished amongst your fellow-men, fail not as you love justice, to exonerate the Government which has so enriched you with its paternal Godspeed.

Now, gentlemen, it were very unwise, not to say unfair, to tell you of the opportunities with which the course beginning at the door yonder is strewn for you, and stop there. Allow me to explain. Let say what will, the American press has one virtue which, in my judgment, quite redeems its every fault. It makes haste, on the appearance of evil, to give us instant warning. Take up any respectable paper, read it, and strange as it may sound and seem, a revolution is upon us, and if we ask the end of it or what will be left after its passage, the last of the prophets died long ago. Of this much we are certain: Fighting has begun, and both the Government and society are threatened. Accept the suggestion and think about it, and presently some of the opportunities within my meaning will arise and shape themselves before you. Indeed, there will be occupation, and plenty of it, for those of you who do not go to sea.

Next, to such of you as do go to sea. Be you also of good cheer; though the sea is pathless, the winds that make their playgrounds on it will be found alive with chances of distinction and good service.

It were useless denying that up to the present the Army has been more a favorite with our people than the Navy. I have belonged to it in two wars, and deny now the slightest wavering in my loyalty to its dead and living, to its Scotts and Taylors, its Grants and Sheridans more especially to the mightier host of unprofessionals who volunteered in emergencies and must continue nameless because they were countless. Wherefore you will not suspect me of a doubtful motive when I declare to you deliberately that the day is near, if it have not already arrived, when the Navy is to transcend the Army in popular favor.

This I think but a rational deduction. The work of the Army is done. The Indians are quieted. They are in reservations. With a few exceptions the tribes are turning farmers. The untamables amongst them are buried with their hatchets. There are no frontiers for them to harry. A sea of settlements has swallowed them. Or if they are again heard of, it will be as voters. So much for the present. Next, what does the future hold for the Army? What one promise of glory or popularity or opportunity for either? Will we ever again turn to it for a President?

Let us first try to unveil what may be for it within our borders. The revolution of which I have spoken is bound to evoke the militia. It is the signal for raising up the despised National Guards for the defense of the States, leaving the regulars but a well organized and officered reserve. If occasionally the latter are called out the victories awaiting them must be victories over mobs. In brief, it looks—and I say it in no spirit of malice—it looks as if henceforth the life of the regular is to be that of the barracks. In a word, gentlemen, here at home there are no sections to collide with each other, and no occasion for sections. A loving Providence has so ordered that to insure eternal peace the people have but to smother their demagogues.

With no prospect of service at home of a kind contributive to glory in sight, let us turn our best search light to discover, if possible, what may be offered the Army from abroad. No foreign nation is disposed to quarrel with us. They are the dependents, not we. Our resources are immeasurable. We can grow without them. They are

not rash enough to seriously invade us. Or, if it pleases you, fancy an invading army disembarked upon our coast. It may amuse you to locate their descent, and, studying our railroad facilities for the concentration of troops, say how far they could penetrate before being overwhelmed like Burgoyne. Passing then to the probabilities of an invasion on our part, we have but two neighbors, Canada and Mexico, and their weakness is their safeguard. We can not afford to bully them. Or, if they should provoke us beyond endurance, there might be profit—though in one case at least that is doubtful—in the acquisition of territory, but not enough true glory to fill a lady's thimble. In fact, a country more exposed to attack from us than Canada can not be named. She offers a flank broad as the distance between oceans. One railroad connects her frontiers. To cut it once would work irremediable division. A million men launched at her in supporting columns would reduce the conquest to a summer's campaign. With regard to Mexico, she is safe; for it is never to be forgotten that we have taken the republics of the Western world under protection, and are educated to believe our chieftest honor, not to speak of advantage, lies in an honest assertion of the Monroe doctrine, to the author of which Brazil will this summer erect a monument.

Turn now from this picture of the future of the Army to its corollary relative to the Navy. I have not committed myself, you will observe, to an assertion that there will be no more wars; that would be an Arcadian dream. In my judgment one of the greatest of wars, and in many respects the most interesting, is just before us. In no other way is it possible to adjust dominion in Asia and Africa. To be sure we will have no part in it; yet there is no end to the greed of nations, and the Pacific coast from Alaska to the Horn, and the Atlantic coast from the Horn to Halifax, bear temptations more frequent than light-houses. What is the Monroe doctrine other than a standing challenge to the powers of Europe, singly or in combination? The next ship from Honolulu may bring a cause of war; and, for that matter, the Nicaragua Canal, though but in proposition, is a nest egg of war. The world at large looks with unloving eyes upon lines of trade in close monopoly. Undoubtedly hostilities will come; they are inevitable; but when come, where will the fighting be? *Mira*, young gentlemen! Behold your opportunities! In that day how many places will need your ships! How often your White Squadrons will be looked for from cathedral spires in threatened cities! How many ears will be bent listening for the welcome thunder of your guns in the offing below the water line! If, after gallant effort, you are beaten, there will be tears for you plenteous as rain; if you are victorious, heavens! how you will be whelmed by resolutions unanimously adopted, and by snuffboxes and swords and canes, and by notes in scented envelopes praying your pictures and autographs! And when you bring your prizes in look for the army amongst the spectators gathered on the shore to salute you for dear Old Glory's sake!

As said, I may not grudge you your youth, or your education, or your happy start in life, or the high hopes aflower in your hearts, or your honorable ambitions; but, as the truth may earn me salvation, I wish with all my soul I were young again and a cadet in the Navy. For I do believe the lights which from the beginning have been most alluring to brave men have been transferred from the land to the sea. I do believe that the guns are now fashioned about which you will be called in oft-repeated struggles for renown in life or enduring monuments in death.

In conclusion, the Board of Visitors bid me declare, young gentlemen, that from what they have seen of the Academy, and the systems prevalent in it, especially from the exhibitions given by the classes, they congratulate your officers and professors, and bid me say they have faith in you all, and wish you farewell.

REPORT

OF THE

CHIEF OF THE BUREAU OF YARDS AND DOCKS.

WASHINGTON, D. C., *October 1, 1894.*

SIR: I have the honor to submit the following estimate of amounts needed by this Bureau for the fiscal year ending June 30, 1896, with a report of the work done during the year ending June 30, 1894.

The estimates received from the commandants of the various navy-yards and stations amount to the following:

Improvements	$6,221,712.00
General maintenance	408,313.00
Repairs and preservation	701,206.00
Naval home	81,795.00
Civil establishment	95,089.87
Total	7,508,115.87

After a careful examination the above has been reduced as follows:

Improvements	$1,044,803.00
General maintenance	250,000.00
Repairs and preservation	400,000.00
Contingent	15,000.00
Naval home	79,315.37
Civil establishment	61,597.37
Support of Bureau	10,580.00
Total	1,861,295.74

Under improvements the following are some of the principal items:

Boston.—Rebuilding wharf No. 4. The old one has become dangerous. A modern dry dock is much needed at this point sufficiently large for battle ships.

New York.—A new pumping plant for the granite dry dock is much needed. The old cylinder pumps and engines have been in use since the dock was built, about forty-five years ago; they are worn out. The present boilers were old when put in, seven years ago, and are now safe for only 35 to 40 pounds of steam.

The construction of the two new docks (one completed and the other in progress) at some distance from the old one, has rendered the construction of a workshop for "construction and repair" near the new dry docks very necessary. It is proposed to use this building as a machine, carpenter, and joiner shop for repairs to ships in dry dock.

The old wooden shipwright shed, building No. 44, near the granite dry dock is tumbling down, and is a constant menace to the safety of the yard in case of fire. It is desired to remove it and erect in its place a suitable iron structure.

The equipment paint shop needs extensive repairs.

The Wallabout Channel is constantly silting up, so an appropriation is asked for dredging. A small amount is asked for continuing the quay walls around Whitney Basin and the cob dock, both of which are important.

League Island.—Small estimates are submitted for the following items: Extending the quay wall eastward in accordance with the recommendations of a board on permanent improvements; for the continuation of a light retaining wall along the western end of the island, as recommended by the same board; dredging along the west dry dock pier and removal of an old crib work (to begin the work); sinking an artesian well; repairing walks and building a deck scow.

A new dry dock large enough to take in a battle ship is much needed at this yard. No estimate has been submitted for this dock.

Washington yard.—For this yard it is desired to extend the sea wall from wharf No. 4 to new wall. To extend the railroad track to the storehouse. A small roundhouse is needed for the yard locomotive and wrecking car.

Extension of the electric plant, changing fire hydrants to conform to city pattern, and conversion of an old museum into officers' quarters are desirable improvements.

Estimates for the above are submitted.

A new roof for the foundry, in which iron trusses and roof should be substituted for the old wooden trusses and sheathing now on, is much needed as a matter of safety from fire. When large castings are made sparks frequently lodge in and set fire to the woodwork, thereby endangering this very valuable plant.

Norfolk, Va.—The extension of the water front alongside which ships can tie up is very important; the old wooden wharves are fast being destroyed by "teredos." Wharves built less than ten years ago, with creosoted piles, are in a generally unsafe condition to-day. A small estimate for continuing the quay wall in a substantial manner is submitted.

The stone dock is in need of considerable repairs about the gate sill, abutment walls, and floor. If allowed to remain as it is frost will greatly increase the leaks. An estimate has been made for repairs.

A sand lighter, deck scow, and derrick are much needed at this yard, and small sums asked for them.

A new dry dock of sufficient capacity for docking armored cruisers and battle ships at this, the third yard in importance in the country, is very much needed.

Much time is now lost by workmen on ships in dock, owing to the great distance (nearly 2,000 feet) from the shops, and it would be a great step in the line of economy to have a store shed and repair shop built convenient to the dock.

Mare Island.—The ground along the water at this yard has a tendency to slide out into the channel as soon as any weight is added in shore, so that a substantial quay wall becomes a necessity for preserving the water front, and a small amount is asked for to commence a continuation of this wall between the ferry slip and the dry dock. Grading and paving around the dry dock is important.

The granite dock at this yard while large enough to hold a battle ship for cleaning and painting her bottom, if once in, the entrance, or invert, is not flat enough on the floor to admit one. It is desired to cut away the stone somewhat in order to widen the lower part and accommodate the flat floors of the new ships.

A new caisson is much needed.

Three steam capstans are needed around this dock to facilitate handling ships when once pointed in the dock.

The projection of the ferry slip in front of the regular water front of the yard causes eddies, resulting in the deposit of silt, which is very rapid, necessitating constant dredging in order to maintain a proper depth along the wall. Yards roads are being gradually extended to render the communication more easy.

Small estimates are submitted for the above as well as for much needed improvement to the steam-engineering coppersmith shop and also the purchase and installation of railroad scales of capacity of 60 tons.

In addition to the items estimated for, a new wooden dry dock is very much needed at this yard, where all the vessels of the Pacific and Asiatic stations are repaired. The enlargement of the present dock would not admit of repairs to the bottoms of our battle ships and would not admit them in case, as it is thought very probable, they should require to be fitted with bilge keels. There is no dock south of Port Orchard, Puget Sound (where a dock is now being constructed), that would be available for them. And at Port Orchard there are no resources for repairs.

The ferry slip projects into the water to such a distance that the resulting eddies deposit large quantities of silt. It is thought that moving this slip back so that the entrance should be flush with the quay wall would be a great-economy.

Port Royal, S. C., where the dry dock is now approaching completion, roadways, grading, and drainage, hydrant system, storage cisterns, and fencing are needed; and small estimates are submitted for these.

In order that this dock may be used for repairs a "construction and repair" workshop should be erected.

The water frontage is now but 800 feet, including the dry dock, which is about the middle of this; it is entirely too small, and I would recommend the acquisition by the Government of more land.

Key West, Fla., is growing in importance as a coaling station, but at present we have but one wharf from which vessels can receive coal and that is separated from the coal shed by a vacant lot and the custom-house, a distance of one-eighth of a mile. It is recommended that steps be taken to purchase an additional lot and also to build an iron coaling wharf in front of the coal shed.

Algiers, La.—The purchase of this site is now being completed, and a small estimate submitted for commencing work.

Puget Sound.—The dry dock at this place is progressing rapidly, and when completed it will be necessary to have a "construction and repair" shop, for effecting such repairs to ships as may be needed. There will also be a necessity for dredging, building wharves, clearing off station, building offices and quarters for the officers needed. Estimates submitted for all but the repair shop and wharves.

PRINCIPAL ITEMS OF WORK DONE DURING PAST YEAR.

During the year an effort has been made to keep the buildings, dry docks, wharves, etc., at the various navy-yards and stations in repair, and prevent decay. But owing to the constant rearranging and changing necessitated by new tools and the demands of the constructing departments at the yards, it is only by the closest and in most cases an unwise economy that the appropriation is made to hold out.

In addition to these repairs the following is a statement of some of the work accomplished during the past year:

Portsmouth, N. H.—Boiler house for buildings No. 45 and 46, commenced in the previous year, has been completed, and boiler shop, building No. 10, has been built under contract, with steel frame and roof.

Boston, Mass.—Wharves 1, 5, and 6 have been repaired and are now in good condition.

An enlargement of the naval prison is now being effected under contracts, which will greatly improve its usefulness and general sanitary condition.

New York.—Ship-house E has been sold and removed from the yard. Metal roofs have been substituted for the old rotten and dangerous wooden ones on several of the boiler houses and on the foundry. The yard wall rebuilt and repaired, quay wall at Cob dock extended; 100,000 cubic yards of mud have been dredged from the water front.

The work on the new dry dock, under contract, has progressed but slowly in spite of much urging on the part of the Bureau.

League Island, Pa.—3,240 feet of light retaining wall has been built along the Delaware front of the upper end of the island. Much of the more solid protection wall along the water front about the dock and piers has been completed, and the east and west dry dock piers are progressing favorably. The drainage of the dry dock has been improved by the addition of another pump. The coping of the dock has been raised 12 inches. Dikes and walls injured by storms have been repaired but need strengthening.

The work of dredging material from the river front and filling in, under act of March 2, 1889, was completed in November last, at a cost of $24,523.48. With the material dredged, an area of 15.5 acres lying west of the mold loft and dry dock has been reclaimed, and brought up to the yard level, forming a valuable extension of the yard proper.

Washington, D. C.—The dredging appropriated for in 1892 has been done. The breech-mechanism shop completed and the electric-light plant installed. The work of converting the mold loft into a forge shop has progressed favorably, but the reconstruction of the old forge shop awaits the completion of the mold loft, so that work can be transferred from one to the other. Various repairs to buildings, sea wall, etc., have been effected.

Norfolk, Va.—The coal shed has been completed. Under last year's appropriation the quay wall has been extended 150 feet, and a 5-ton crane mounted on it. Experiments have been made in driving a number of small artesian wells to a depth of from 60 to 75 feet, with satisfactory results, the water being excellent, though the supply from each is small. Should this water continue to be of good quality it is proposed to increase the number of wells sufficiently to maintain an ample supply for the whole yard. The floating gate for the granite dry dock has been completed. Dry-dock pump house has been repaired. New floor laid in equipment cordage room. About 6,000 square feet pavement around dry dock laid; and 4,000 lineal feet concrete drains around crane track. Extensive repairs made to floors, roof trusses, and roofs of buildings Nos. 9, 28, 29, 34, and 36, and 9,000 cubic yards dredged from timber basin.

Mare Island, Cal.—The available water front of the yard has been improved by the removal of a return wall at the sectional dock basin, extending the quay wall from the dry dock to the basin, and dredging 107,500 cubic yards of mud from the river. The mud so dredged was

deposited on the tule land, thus raising 18 acres of this swamp to a height of about 3 feet above tide water. Shed over bending slabs and angle furnaces, oil house for general storekeeper, and dry-air closets for workmen have been completed. Engine house for the Corliss engine for construction and repair is near completion, and a 40-ton locomotive crane for dry dock has been contracted for and is well under way.

Port Royal, S. C.—The four officers' quarters, boathouse and barn appropriated for have been completed. The dry dock, being constructed under a contract with Justin McCarthy, is nearly completed; at date of this report the caisson is in place, the pump and boiler houses are well under way, and it is hoped the removal of the outer face of cofferdam will soon be accomplished.

Within the last four months stress has been brought on the lower cross altars at the head of the dock, and they have curved in somewhat. The contractor is preparing to remedy this defect. Probably a drain will be put in. The Bureau has about completed a contract for dredging the entrance. All the material for the wing dams about the entrance has been delivered and is being worked into place.

Puget Sound, Wash.—The dry dock at Port Orchard is progressing rapidly, and if the present rate is kept up it will probably be completed much ahead of time.

New London, Conn., Key West and Pensacola, Fla.—The ordinary repairs have been made.

Naval Home, Philadelphia.—The following table shows the changes among the beneficiaries during the last fiscal year:

On rolls, July 1, 1893	198	
Original admissions	28	
Readmissions	7	
Total		233
Died	16	
Dropped, absent, and unaccounted for	2	
Dismissed	3	
Discharged at own request	1	
Transferred to Government Hospital for Insane, near Washington, D. C	4	
Total		26
Total remaining June 30, 1894		207

Commodore E. E. Potter, U. S. Navy, governor of this institution, reports that a larger appropriation is needed under the head "repairs" to buildings, furnaces, furniture, etc., as the $5,000 that has been appropriated is found insufficient to keep these old buildings in repair, and he recommends an increase of $2,000, which the Bureau thinks should be granted.

The steam boiler and machinery have been well cared for by the beneficiaries who were firemen in the service. The health of the beneficiaries has been as usual, and a comfortable state of discipline maintained.

Attention is called, however, to the fact that there are only twenty-two vacant rooms remaining, whilst the number of continuous service men in the Navy, for whose special benefit this Home was established, is rapidly increasing.

In this connection I would urge that the wharf and land cut off from the Home by the railroad should be sold and the proceeds devoted to increased accommodations for and additional comfort of the beneficiaries.

A statement of the amounts expended under each specific head of

appropriations during the fiscal year 1894, and the balance remaining unexpended as required by law, is appended.

An abstract of offers for special objects of improvement and supplies coming under the cognizance of this Bureau is made in conformity to act of March 3, 1843.

Also a report showing the amount expended during the fiscal year 1894 from appropriations pertaining to this Bureau for civilians employed on clerical duty, or in any other capacity than as mechanics and workingmen at the various yards and stations, with estimates for the fiscal year 1896, in accordance with law.

Very respectfully, your obedient servant,

E. O. MATTHEWS,
Chief of Bureau of Yards and Docks.

The SECRETARY OF THE NAVY.

No. 1.—*Report of expenditures at navy-yards, stations, and Naval Home, for the years ending June 30, 1894.*

Yards and stations.	Appropriations.					
	Yard improvements and Naval Home.	Repairs and preservation.	General maintenance.	Civil establishment.	Contingent.	Total.
Portsmouth, N. H	$7,430.54	$15,692.20	$18,603.02	$6,865.25		$48,591.01
Boston, Mass	23,339.71	23,103.60	24,504.30	5,383.76		76,391.37
New London, Conn		1,399.88	5,854.62			7,254.50
New York, N. Y	140,327.75	129,618.31	52,673.49	16,236.60		338,856.15
League Island, Pa	100,627.57	33,694.79	15,706.43	4,067.96	$1,500.00	155,596.75
Washington, D. C	20,055.37	26,074.59	16,951.63	4,278.00	1,456.68	68,816.27
Norfolk, Va	53,483.09	52,169.20	33,003.08	8,552.79		147,208.17
Pensacola, Fla		11,318.67	10,660.75	1,930.00		23,909.42
Mare Island, Cal	89,175.46	36,892.95	54,222.26	12,212.46		192,503.13
Sacketts Harbor, N. Y			36.00	365.00		401.00
Key West, Fla		1,385.77	1,657.53	600.00		3,643.30
Naval Home, Pa	67,220.52					67,220.52
Wharf at Erie, Pa					548.00	548.00
Port Royal, S. C	91,101.93	3,845.63	2,342.35		3,877.41	101,167.32
Puget Sound, Wash	215,162.49		3,909.89			219,072.38
Total	807,984.43	335,195.60	240,125.35	60,491.82	7,382.09	1,451,179.29

No. 2.—*Detailed report from navy-yards and stations of expenditures under "repairs and preservation" during the fiscal year ending June 30, 1894.*

Objects.	Portsmouth.	Boston.	New London.	New York.	League Island.	Washington.
Yard buildings	$3,302.36	$5,218.85	$61.68	$21,926.38	$10,741.63	$9,216.84
Officers' quarters	1,118.22	4,408.98	114.90	4,484.43	5,317.33	1,983.29
Wharves, bridges, landings, and boats	178.43	1,000.00	787.79	38,118.48	62.64	1,943.98
Roads, walks, gutters, and drains	2,244.59	2,941.74	130.50	11,085.09	2,798.40	2,745.23
Fences and walls	112.21	176.12	40.30	14,127.17	439.11	819.23
Cranes, scows, and derricks	20.45			575.52	760.83	42.08
Furnaces, forges, heating apparatus, etc	2,232.29	2,089.15	49.60	3,202.67	234.58	4,632.70
Tracks and scales		93.65		672.16		2,886.09
Water and gas works, telephone and telegraph, and electric-light works	3,739.34	2,354.29		4,824.38	6.08	1,350.06
Dredging and scowing				26,500.00		
Dry docks	72.19	1,084.15		3,188.83	9,098.15	
Miscellaneous repairs	2,512.84	1,128.00	215.11	913.20	2,736.17	203.45
Repairs to dikes					1,499.87	
Coal		2,608.67				
Holiday	159.28					251.64
Quarantine duty						
Western Union Telegraph Company, paid by general storekeeper						
Total	15,692.20	23,103.60	1,399.88	129,618.31	33,694.79	26,074.59

No. 2.—*Detailed report from navy-yards and stations of expenditures under "repairs and preservation" during the fiscal year ending June 30, 1894*—Continued.

Objects.	Norfolk.	Pensacola.	Mare Island.	Key West.	Port Royal.	Total.
Yard buildings	$9,333.70	$1,713.43	$5,502.26	.....	$1,125.41	$68,142.54
Officers quarters	4,382.96	1,613.69	8,484.25	.....	1,251.65	33,159.70
Wharves, bridges, landings, and boats	475.17	756.86	437.21	.....	274.09	44,034.65
Roads, walks, gutters, and drains	3,566.15	839.30	5,322.94	.....	563.12	32,237.06
Fences and walls	465.12	986.70	1,071.70	.....	63.29	18,300.95
Cranes, scows, and derricks	508.53	497.92	1,515.29	.....	.....	3,920.62
Furnaces, forges, heating apparatus, etc	610.68	122.04	2,010.64	.....	4.50	15,188.85
Tracks and scales	419.46	332.21	256.00	.....	.....	4,659.57
Water and gas works, telephone and telegraph, and electric-light works	444.43	1,955.36	1,686.85	.....	250.28	16,611.07
Dredging and scowing	1,204.00	.....	683.61	.....	.....	28,387.61
Dry docks	24,022.75	186.60	4,129.99	.....	.....	41,782.66
Miscellaneous repairs	6,736.26	2,042.24	5,789.04	$1,385.77	313.29	23,975.37
Repairs to dikes	.....	.....	.....	.....	.....	1,499.87
Coal	.....	.....	.....	.....	.....	2,608.67
Holiday	.....	150.16	.....	.....	.....	561.08
Quarantine duty	.....	122.16	.....	.....	.....	122.16
Western Union Telegraph Company, paid by general storekeeper	.....	.....	3.17	.....	.....	3.17
Total	52,169.21	11,318.67	36,892.95	1,385.77	3,845.63	335,195.60

No. 3.—*Detailed report of expenditures under "general maintenance" received from yards and stations during the fiscal year ending June 30, 1894.*

Objects.	Portsmouth.	Boston.	New London.	New York.	League Island.	Washington.	Norfolk.
Freight and transportation	$6.00	$5.75	.....	$20.87	.....	$8.45	.....
Printing, stationery, and advertising	302.34	327.66	$27.00	1,673.88	$471.43	382.38	$299.64
Books, maps, models, and drawings	38.72	326.79	.....	358.67	.....	15.00	232.05
Purchase and repair of fire engines	.....	.....	.....	.....	21.48	27.61	204.28
Machinery of every description and patent rights	.....	60.14	9.18	595.79	247.78	23.10	221.78
Repairs on steam engines and attendance on same	.....	.....	.....	4,716.87	.....	.....	1,862.08
Purchase and maintenance of oxen and horses, pay of hired teams, etc	2,898.78	3,990.57	1,046.52	7,232.53	5,540.22	3,956.67	4,261.64
Carts, timber wheels, and tools of every description	513.94	1,807.41	10.12	1,677.54	363.89	1,053.80	1,984.56
Postage on letters on public service and telegrams and telephones	94.00	4.00	98.58	240.59	.....	117.54	560.46
Furniture for Government houses and offices in navy-yards	155.40	1,051.78	4.00	604.68	15.43	1,061.68	776.62
Coal and other fuel	2,151.67	3,083.73	73.53	2,643.77	1,661.92	1,931.83	600.00
Candles, oil, gas, and electric lights	1,408.12	610.08	11.91	3,067.53	61.53	1,028.88	8,300.67
Cleaning and clearing up yards and care of buildings	1,950.75	2,673.26	1,486.50	8,887.41	665.20	5,641.13	233.34
Attendance on fires, lights, fire engines, and apparatus	2,296.16	1,166.94	.....	3,251.01	2,590.70	144.23	1,147.59
Incidental labor, not chargeable to other appropriations	2,780.16	251.22	759.00	1,776.90	.....	1,105.17	577.87
Water tax and ice	.....	5,019.86	13.28	8,504.95	.....	.....	71.14
Tolls and ferriage	.....	.....	25.00	130.00	.....	.....	88.75
Pay of watchmen	3,942.00	4,037.00	2,190.00	7,111.50	1,446.00	.....	11,534.00
Flags, awnings, and packing boxes	29.62	88.11	.....	179.00	20.82	330.36	46.61
Rent of landings	.....	.....	100.00	.....	.....	.....	.....
Rent of officers' quarters, Philadelphia, Pa	.....	.....	.....	.....	2,600.00	.....	.....
Holidays	35.36	.....	.....	.....	.....	123.80	.....
Miscellaneous supplies	.....	.....	.....	.....	.....	.....	.....
Total	18,603.02	24,504.30	5,854.62	52,673.49	15,706.43	16,951.63	33,003.08

No. 3.—*Detailed report of expenditures under "general maintenance" received from yards and stations during the fiscal year ending June 30, 1894*—Continued.

Objects.	Pensacola.	Mare Island.	Key West.	Sacketts Harbor.	Port Royal.	Puget Sound.	Total.
Freight and transportation	$14.74	$1,223.23	.....	.....	$97.63	.....	$1,376.67
Printing, stationery, and advertising	188.96	871.74	$60.84	.....	108.95	$82.35	4,797.17
Books, maps, models, and drawings	.....	.....	.....	.....	.....	.....	971.23
Purchase and repair of fire engines	28.10	.....	.....	.....	.....	.....	281.47
Machinery of every description and patent rights	41.75	.....	.....	.....	.....	.....	1,199.52
Repairs on steam engines and attendance on same	159.72	1,613.79	.....	.....	19.75	.....	8,372.21
Purchase and maintenance of oxen and horses, pay of hired teams, etc	1,460.42	11,348.94	.....	.....	591.84	.....	42,328.13
Carts, timber wheels, and tools of every description	372.21	1,220.28	30.71	.....	40.75	122.05	9,197.26
Postage on letters on public service and telegrams and telephones	.33	3,006.48	67.00	.....	6.00	.....	4,194.98
Furniture for Government houses and offices in navy-yards	392.20	1,672.26	39.98	.....	104.70	788.06	6,666.79
Coal and other fuel	227.13	8,973.81	.....	$36.00	.....	.....	21,383.39
Candles, oil, gas, and electric lights	81.42	1,780.21	9.55	.....	197.00	109.10	16,666.00
Cleaning and clearing up yards and care of buildings	546.06	4,588.97	.....	.....	290.00	.....	26,962.65
Attendance on fires, lights, fire engines, and apparatus	1,449.55	6,640.18	.....	.....	205.00	.....	18,891.36
Incidental labor, not chargeable to other appropriations	127.76	278.98	.....	.....	242.70	2,808.33	10,708.09
Water tax and ice	196.00	6,727.04	54.45	.....	36.00	.....	20,622.72
Tolls and ferriage	60.00	2,070.00	.....	.....	327.19	.....	2,700.94
Pay of watchmen	5,314.40	2,129.60	1,395.00	.....	.....	.....	39,099.50
Flags, awnings, and packing boxes	.....	76.75	.....	.....	17.84	.....	789.11
Rent of landings	.....	.....	.....	.....	.....	.....	100.00
Rent of officers' quarters, Philadelphia, Pa	.....	.....	.....	.....	.....	.....	2,600.00
Holidays	.....	.....	.....	.....	.....	.....	159.16
Miscellaneous supplies	.....	.....	.....	.....	57.00	.....	57.00
Total	10,660.75	54,222.26	1,657.53	36.00	2,342.35	3,909.89	240,125.35

No. 4.—*Estimates received from navy-yards, stations, and Naval Home for fiscal year ending June 30, 1896.*

Yards and stations.	Appropriations.				
	Yard improvements and Naval Home.	Repairs and preservation.	General maintenance.	Civil establishment.	Total.
Portsmouth, N. H	$215,000.00	$16,225.00	$20,224.00	$5,330.20	$256,779.20
Boston, Mass	15,000.00	33,500.00	29,775.00	7,424.25	85,699.25
New London, Conn	975.00	1,600.00	6,581.00	.....	9,156.00
New York, N. Y	1,272,690.52	336,173.66	87,800.00	26,596.63	1,623,260.81
League Island, Pa	679,538.49	42,460.58	31,926.48	4,278.00	758,203.55
Washington, D. C	67,979.21	30,100.00	21,245.00	5,545.25	124,869.46
Norfolk, Va	1,146,950.00	123,500.00	67,765.00	11,123.63	1,349,338.63
Pensacola, Fla	.....	83,972.80	19,204.74	2,488.32	105,665.86
Mare Island, Cal	1,530,328.89	116,374.50	100,674.36	20,654.14	1,768,031.89
Sacketts Harbor, N. Y	.....	350.00	.....	366.00	716.00
Key West, Fla	675,000.00	9,249.00	2,317.50	600.00	687,166.50
Naval Home, Pa	81,795.00	.....	.....	.....	81,795.00
Port Royal, S. C	118,529.71	7,700.00	13,750.00	6,140.20	146,119.91
Puget Sound	499,719.74	.....	7,050.00	4,543.25	511,312.99
Total	6,303,506.56	701,205.54	408,313.08	95,089.87	7,508,115.05

No 5.—*Detailed estimates from yards and stations for works of improvement for the fiscal year ending June 30, 1896.*

Yards, stations, and objects.	Estimates.	Total.
PORTSMOUTH, N. H.		
Timber dry dock, for first year	$200,000.00	
Repairs to ship houses Nos. 4, 5, and 53	15,000.00	
		$215,000.00
BOSTON, MASS.		
Building wharves	15,000.00	
		15,000.00
NEW LONDON, CONN.		
Wagon scale	325.00	
Coal shed	650.00	
		975.00
NEW YORK, N. Y.		
Boilers and pumps for granite dock	40,000.00	
Extending copper and blacksmith shop, No. 28	41,906.53	
Grading paving, laying sidewalks and sewers on portions of Decatur, Warrington, Perry, McDonough, Third, Fifth, and Sixth streets, along quay wall and around new timber dry dock	122,931.00	
Quay wall at coal dock	100,349.00	
Extension of storehouse No. 33	58,789.00	
C. and R. workshop between timber docks, No. 27	85,240.00	
C and R. shipwright shed, No. 44	6,534.13	
Quay wall inside Whitney Basin	136,805.00	
Dredging Whitney Basin	55,000.00	
Extension of railroad system	27,293.00	
Pier and drawbridge across Wallabout	120,000.00	
New 550-foot pier from port warden's line on East River to cob dock	88,342.86	
Addition to commandant's house	16,000.00	
Quay wall on cob dock	123,500.00	
Barracks and recruiting station, cob dock	250,000.00	
		1,272,690.52
LEAGUE ISLAND, PA.		
Pier from east end of new sea wall east of Broad street	96,915.00	
Two hundred lineal feet of sea wall	23,750.00	
Dredging in front of west dry-dock pier and near new sea wall	20,000.00	
Water-supply system for yard	21,688.63	
Widening and straightening 9,330 lineal feet of dikes	19,290.10	
Railroad tracks	8,046.01	
Two 20-ton wharf cranes and four 12-ton wharf cranes	15,618.94	
Floating pile driver	5,500.00	
Traveling crane around dry dock	50,000.00	
Two thousand lineal feet of light retaining wall from site of new building slips toward lower end of island	37,500.00	
Sidewalks	6,926.72	
West wall of causeway, 1,370 feet	162,587.50	
Three new officers' quarters	35,000.00	
Commmandant's office	53,735.59	
100-foot plate-bending shop	75,000.00	
Two deck scows at $2,000 each	4,000.00	
One building slip	35,000.00	
		679,538.49
WASHINGTON, D. C.		
Extension of sea wall from lower wharf No. 4 west to intercept new wall on west side	4,569.21	
New iron roof on foundry and reconstruction of entire building No. 22	33,100.00	
Standard fire hydrants to conform to city standards	1,560.00	
Conversion upper floor sail loft (store No. 6) into seamen gunners' quarters	2,000.00	
Extension railroad to store No. 2	3,250.00	
Landing platform and slip for barge	6,000.00	
Roundhouse for yard locomotive and wrecking crane	4,500.00	
Extension electric-light plant	5,000.00	
Converting museum building No. 6 into two officers' quarters	8,000.00	
		67,979.21
NORFOLK, VA.		
New ship fitters' shop	215,200.00	
Extension of quay wall	100,000.00	
Wharf south of dry docks	43,000.00	
Extension of electric plant	10,000.00	
Sewers, drains, and water closets in offices and shops	15,000.00	
Toward converting timber basin into a fitting and repair basin	100,000.00	
Repair basin	600,000.00	
One crane scow (45-ton capacity)	10,000.00	
One deck scow	2,000.00	
One sand lighter	2,000.00	
One derrick car	1,000.00	
Store shed between dry docks	18,750.00	
Repairs t dry dock	30,000.00	
		1,146,950.00

No. 5.—*Detailed estimates from yards and stations for works of improvement for the fiscal year ending June 30, 1896*—Continued.

Yards, stations, and objects.	Estimates.	Total.
PORT ROYAL, S. C.		
Roadways	$5,572.67	
Purchase of property	20,000.00	
Extension of fire-hydrant system	1,385.75	
Storage cisterns	3,757.88	
Chemical engines	650.00	
Hospital	4,104.73	
Artesian well	75,000.00	
Boundary fence	1,190.67	
Lightning rods	532.08	
Preservation of dry dock (tarring)	342.93	
Grading and drainage	5,993.00	
		$118,529.71
KEY WEST, FLA.		
Purchase of Mallory lot	20,000.00	
Iron coaling wharf	30,000.00	
Coal shed with facilities for handling	25,000.00	
Floating dry dock	600,000.00	
		675,000.00
MARE ISLAND, CAL.		
Extension of quay wall to coal shed	88,305.80	
Quay wall between ferry slip and stone dock	52,793.48	
One 12-ton pillar wharf crane	4,034.20	
Free bridge between Vallejo and the yard	205,060.00	
Moving back ferry slip alternative of above, $73,754.89.		
Pointing granite work of stone dock	4,742.87	
Guard chain about stone dock	1,470.50	
Grading and paving stone dock	30,445.93	
Enlarging entrance of stone dock	20,736.50	
Three steam capstans for stone dock	5,971.11	
New caisson for stone dock	53,000.00	
New dry dock	900,000.00	
Dredging	20,000.00	
Railroad scales	1,640.63	
Yard roads	32,827.14	
Renewing board sidewalks	5,684.22	
Coal shed for yards and docks	8,395.00	
New coal shed for equipment	25,713.65	
Coal shed for steam engineering	2,138.58	
Ship fitters' shed	30,000.00	
Storage shed for construction	10,138.38	
Yard chapel	8,000.00	
Dispensary and medical storehouse	14,385.07	
Greenhouse for nursery	4,845.83	
		1,530,328.89
PUGET SOUND, WASHINGTON.		
Dry dock, continuation	136,873.89	
Wharf at dry dock	145,626.83	
Shop at dry dock	109,899.02	
Dredging, approach to dry dock	50,000.00	
Officers' quarters	28,000.00	
Roadway	12,000.00	
Clearing station	12,320.00	
Office building	5,000.00	
		499,719.74
NAVAL HOME, PHILADELPHIA, PA		81,795.00
Grand total		6,303,506.56

No. 6.—*Detailed estimates from navy-yards and stations for "repairs and preservation" for the fiscal year ending June 30, 1896.*

Objects.	Portsmouth.	Boston.	New London.	New York.	League Island.	Washington.
Yard buildings	$5,000.00	$10,000.00	$250.00	$139,833.66	$21,156.40	$6,000.00
Officers' quarters	1,200.00	2,000.00	450.00	6,522.00	2,820.35	3,000.00
Wharves, bridges, landings, and boats	1,500.00	1,500.00	100.00	11,490.00	349.60	250.00
Roads, walks, gutters, and drains	2,000.00	7,500.00	150.00	6,130.00	5,660.90	5,000.00
Fences and walls	500.00	500.00	50.00	500.00	2,549.50	100.00
Cranes, scows, and derricks	1,000.00	500.00	.....	16,090.00	735.80	200.00
Furnaces, forges, heating apparatus, etc	1,500.00	3,000.00	50.00	939.00	915.42	4,500.00
Tracks and scales	25.00	500.00	.....	1,689.00	203.73	6,000.00
Water and gas works and electric light works	2,000.00	2,500.00	50.00	4,240.00	10.00	5,000.00
Dredging and scowing	.....	1,000.00	.....	40,000.00	.....	.....
Dry docks	500.00	2,000.00	.....	1,540.00	984.40	.....
Miscellaneous repairs	1,000.00	2,500.00	500.00	7,200.00	2,495.69	50.00
Dikes	.....	.....	.....	.....	4,578.79	.....
Cistern	.....	.....	.....	.....	.....	.....
Coal	.....	.....	.....	.....	.....	.....
Total	16,225.00	33,500.00	1,600.00	236,173.66	42,460.58	30,100.00

Objects.	Norfolk.	Pensacola.	Mare Island.	Sackettts Harbor.	Key West.	Port Royal.	Total.
Yard buildings	$30,000.00	$8,007.65	$43,250.43	.....	$1,247.50	$1,600.00	$266,345.64
Officers' quarters	5,000.00	8,172.98	12,261.74	.....	450.00	800.00	42,677.07
Wharves, bridges, landings, and boats	25,600.00	25,356.71	4,134.34	.....	5,253.25	700.00	75,633.90
Roads, walks, gutters, and drains	5,000.00	1,761.02	22,227.81	.....	182.25	1,200.00	56,811.98
Fences and walls	1,000.00	2,778.40	10,809.09	.....	843.00	400.00	20,029.99
Cranes, scows, and derricks	5,000.00	2,166.00	1,575.69	.....	.....	200.00	27,467.49
Furnaces, forges, heating apparatus, etc	2,000.00	468.45	4,437.93	.....	.....	350.00	18,160.80
Tracks and scales	1,500.00	795.76	819.65	.....	.....	150.00	11,683.14
Water and gas works and electric-light works	2,000.00	2,958.38	6,040.70	.....	.....	300.00	25,099.08
Dredging and scowing	10,000.00	15,720.00	700.00	.....	.....	.....	67,420.00
Dry docks	30,000.00	13,785.57	950.00	.....	.....	600.00	50,359.97
Miscellaneous repairs	7,000.00	2,001.88	9,167.12	$350.00	1,273.00	1,400.00	34,937.69
Dikes	.....	.....	.....	.....	.....	.....	4,578.79
Cistern	.....	.....	.....	.....	.....	.....	.....
Coal	.....	.....	.....	.....	.....	.....	.....
Total	123,500.00	83,972.80	116,374.50	350.00	9,249.00	7,700.00	701,205.54

No. 7.—*Detailed estimate for "general maintenance" received from yards and stations for the fiscal year ending June 30, 1896.*

Objects.	Portsmouth.	Boston.	New London.	New York.	League Island.	Washington.
Freight and transportation	$25.00	$25.00	.....	$400.00	.....	$25.00
Printing, stationery, and advertising	300.00	300.00	$50.00	1,500.00	$471.43	300.00
Books, maps, models, and drawings	50.00	1,000.00	.....	1,000.00	.....	25.00
Purchase and repair of fire engines	100.00	.....	.....	500.00	499.00	25.00
Machinery of every description and patent rights	50.00	.....	100.00	8,000.00	375.00	50.00
Repairs on steam engines and attendance on same	.....	.....	.....	8,000.00	1,461.76	25.00
Purchase and maintenance of oxen and horses, pay of hired teams, etc	4,000.00	5,000.00	1,100.00	16,000.00	9,208.37	5,000.00
Carts, timber wheels, and tools of every description	500.00	2,000.00	350.00	8,000.00	1,317.80	2,500.00
Postage on letters on public service and telegrams	124.00	50.00	200.00	300.00	.....	25.00
Furniture for Government houses and offices in navy-yards	500.00	1,000.00	100.00	5,000.00	2,278.00	2,500.00
Coal and other fuel for yards and docks purposes	2,500.00	4,000.00	.....	7,000.00	2,196.50	2,370.00
Candles, oil, and gas	1,500.00	300.00	20.00	300.00	1,321.60	1,050.00
Cleaning and clearing up yards and care of buildings	2,000.00	4,000.00	1,500.00	8,000.00	5,923.00	5,500.00
Attendance on fires, lights, fire engines and apparatus	2,500.00	2,000.00	.....	5,000.00	2,219.20	50.00
Incidental labor, not chargeable to other appropriations	2,000.00	500.00	800.00	3,000.00	.....	1,500.00
Water tax and ice	.....	4,500.00	15.00	8,000.00	.....	.....
Tolls and ferriage	25.00	.....	25.00	200.00	.....	.....
Pay of watchmen	4,000.00	5,000.00	2,196.00	7,200.00	1,446.00	.....
Flags, awnings, and packing boxes	50.00	100.00	25.00	400.00	608.82	300.00
Rent of landings	.....	.....	100.00	.....	.....	.....
Rent of officers' quarters, Philadelphia, Pa	.....	.....	.....	.....	2,600.00	.....
Total	20,224.00	29,775.00	6,581.00	87,800.00	31,926.48	21,245.00

No. 7.—*Detailed estimate for "general maintenance" received from yards and stations for the fiscal year ending June 30, 1896*—Continued.

Objects.	Norfolk.	Pensacola.	Mare Island.	Key West.	Port Royal.	Puget Sound.	Total.
Freight and transportation	$100.00	$25.00	$3,466.56	$50.00	$100.00	.....	$4,216.56
Printing, stationery, and advertising	500.00	254.50	1,000.00	10.00	250.00	$300.00	5,235.93
Books, maps, models, and drawings	500.00	68.00	2,134.72	.....	150.00	.....	4,927.72
Purchase and repair of fire engines	500.00	1,407.10	2,067.00	.....	300.00	.....	5,398.10
Machinery of every description and patent rights	1,000.00	171.00	7,030.00	.....	600.00	.....	17,376.00
Repairs on steam engines and attendance on same	8,000.00	931.82	5,101.92	.....	.....	.....	23,520.50
Purchase and maintenance of oxen and horses, pay of hired teams, etc	15,450.00	1,532.48	15,454.16	.....	800.00	.....	73,545.01
Carts, timber wheels, and tools of every description	5,000.00	985.00	4,158.64	.....	400.00	.....	25,211.44
Postage on letters on public service and telegrams	25.00	25.00	4,590.36	67.00	100.00	.....	5,506.36
Furniture for Government houses and offices in navy-yards	2,000.00	1,193.00	2,779.68	.....	2,500.00	.....	19,850.68
Coal and other fuel for yards and docks purposes	3,500.00	234.00	14,545.00	.....	1,200.00	600.00	38,145.50
Candles, oil, and gas	5,000.00	274.95	1,650.00	112.50	600.00	150.00	12,279.05
Cleaning and clearing up yards and care of buildings	5,760.00	1,658.69	13,654.40	.....	1,800.00	3,000.00	52,796.09
Attendance on fires, lights, fire engines and apparatus	3,676.00	2,478.76	9,601.28	.....	850.00	3,000.00	31,375.24
Incidental labor, not chargeable to other appropriations	5,000.00	78.64	1,000.00	1,995.00	1,200.00	.....	17,073.64
Water tax and ice	.....	196.00	7,200.00	73.00	600.00	.....	20,584.00
Tolls and ferriage	150.00	81.00	2,760.00	.....	.....	.....	3,241.00
Pay of watchmen	11,504.00	7,504.40	2,210.64	.....	2,200.00	.....	43,261.04
Flags, awnings, and packing boxes	100.00	105.40	270.00	10.00	100.00	.....	2,069.22
Rent of landings	.....	.....	.....	.....	.....	.....	100.00
Rent of officers' quarters, Philadelphia, Pa	.....	.....	.....	.....	.....	.....	2,600.00
Total	67,765.00	19,204.74	100,674.36	2,317.50	13,750.00	7,050.00	408,313.08

No. 8.—*Report showing amount expended during the fiscal year ending June 30, 1894, from appropriations pertaining to the Bureau of Yards and Docks for civilians employed on clerical duty or in any other capacity than ordinary mechanics and workingmen at the several navy-yards and stations, and submitting estimate for such civilian employés for the fiscal year 1896, in compliance with the third section of naval appropriation act approved January 30, 1885 (vol. 23, Stat. L., p. 295), for a year of 366 days.*

Navy-yards and rating and rate of pay.	Amount paid to civilians employed during the fiscal year ending June 30, 1894.	Estimates for civilian employés for the fiscal year ending June 30, 1896.	
		Rate of pay.	Amount.
PORTSMOUTH, N. H.			
Clerk, at $1,400 per annum	$1,400.00	$1,400.00	$1,400.00
Mail messenger, at $2 per diem*	725.00	2.00	732.00
Messenger, at $600 per annum	600.00	600.00	600.00
Foreman laborer and head teamster, at 4 per diem*	1,264.00	4.00	1,464.00
Pilot, at $3 per diem*	1,095.00	3.00	1,098.00
Janitor, at $600 per annum	600.00	600.00	600.00
Foreman mason, when required, at $4.50 per diem	1,181.25	4.50	1,413.00
Total	6,865.25	.....	7,307.00
BOSTON, MASS.			
Clerk, at $1,400 per annum	1,400.00	1,400.00	1,400.00
Foreman laborer, at $4 per diem*	1,252.00	4.00	1,256.00
Messenger to commandant, at $1.76 per diem	550.88	1.76	552.64
Messenger, at $1.76 per diem	550.88	1.76	552.64
Mail messenger, at $2 per diem*	730.00	2.00	732.00
Writer, at $900 per annum	900.00	900.00	900.00
Draftsman, at $4.56 per diem	1,379.40	.....	.....
Clerk labor board, at $2.80 per diem	221.20	.....	.....
Total	6,984.36	.....	5,393.28
BROOKLYN, N. Y.			
Clerk, at $1,400 per annum	1,400.00	1,400.00	1,400.00
Writer, at $1,017.25 per annum	1,017.25	1,017.25	1,017.25
Two masters of tugs, at $1,500 each per annum	3,000.00	1,500.00	3,000.00
Two writers, at $900 each per annum	1,666.85	900.00	1,800.00
Foreman laborer, at $4.50 per diem	1,381.00	4.50	1,408.50
Mail messenger, at $2 per diem*	730.00	2.00	730.00
Two messengers, at $2.25 each per diem	1,401.75	2.25	1,408.50
Draftsman, at $5 per diem	1,565.00	5.00	1,565.00
Quarterman, at $3 per diem	934.50	3.00	939.00
Superintendent of teams, or quarterman, at $4 per diem	1,240.00	4.00	1,252.00
Messenger to commandant, at $2.25 per diem*	729.75	2.25	821.25
Electrician, at $1,200 per annum	1,200.00	1,200.00	1,200.00
Leveler, at $4 per diem	1,252.00	.....	.....
Rodman, at $3 per diem	939.00	.....	.....
Quarterman wharf-builder, at $4 per diem	1,108.00	.....	.....
Quarterman laborer, at $3 per diem	315.00	.....	.....
Subinspector, at $3.50 per diem	406.00	.....	.....
Two night inspectors, at $4 per diem	44.00	.....	.....
Total	20,330.10	.....	16,566.75
SACKETTS HARBOR, N. Y.			
Ship-keeper, at $1 per diem*	365.00	1.00	366.00
LEAGUE ISLAND, PA.			
Clerk, at $1,400 per annum	1,399.97	1,400.00	1,400.00
Writer and telegraph operator, at $1,000 per annum	999.99	1,000.00	1,000.00
Messenger, at $2 per diem	626.00	2.00	628.00
Foreman laborer, at $4 per diem	1,062.00	4.00	1,256.00
Leveler, at $3.84 per diem	756.48	.....	.....
Sub inspector, at $3.50 per diem	1,048.25	.....	.....
Rodman, at $2.50 per diem	741.12	.....	.....
Draftsman, at $5 per diem	1,334.00	.....	.....
Total	7,967.81	.....	4,284.00

* Sundays included.

No. 8.—*Report showing amount expended during the fiscal year ending June 30, 1894, from appropriations pertaining to the Bureau of Yards and Docks, etc.*—Continued.

Navy-yards and rating and rate of pay.	Amount paid to civilians employed during the fiscal year ending June 30, 1894.	Estimates for civilian employés for the fiscal year ending June 30, 1896.	
		Rate of pay.	Amount.
WASHINGTON, D. C.			
Clerk, at $1,400 per annum	$1,400.00	$1,400.00	$1,400.00
Messenger, at $2 per diem	626.00	2.00	628.00
Foreman laborer, at $4 per diem	1,252.00	4.00	1,256.00
Electrician, at $1,000 per annum	1,000.00	1,000.00	1,000.00
Trackmaster, at $3.04 per diem	1,007.00	.....	.....
Rodman and leveler, at $3.04 per diem	24.08	.....	.....
Total	4,309.08	.....	4,284.00
NORFOLK, VA.			
Clerk, at $1,400 per annum	1,399.93	1,400.00	1,400.00
Writer, at $1,017.25 per annum	1,011.48	1,017.25	1,017.25
Writer, at $1,000 per annum	1,000.00	1,000.00	1,000.00
Foreman laborer, at $4 per diem	1,252.00	4.00	1,256.00
Mail messenger, at $2 per diem *	730.00	2.00	732.00
Two messengers, at $2 each per diem	1,252.00	2.00	1,256.00
Pilot, at $2.26 per diem	707.38	2.26	709.64
Electrician, at $1,200 per annum	1,200.00	1,200.00	1,200.00
Leveler, at $4 per diem	124.00	.....	.....
Assistant draftsman, at $3.52 per diem	1,094.72	.....	.....
Quarterman, at $3 per diem	116.16	.....	.....
Total	9,887.67	.....	8,570.89
PENSACOLA, FLA.			
Clerk, at $1,200 per annum	1,200.00	1,200.00	1,200.00
Mail messenger, at $2 per diem *	7.30	2.00	7 32
Total	1,930.00	.....	1,932.00
MARE ISLAND, CAL.			
Clerk, at $1,400 per annum	1,400.00	1,400.00	1,400.00
Writer, at $1,017.25 per annum	1,017.25	1,017.25	1,017.25
Foreman mason, at $6 per diem	1,836.00	6.00	1,884.00
Foreman laborer, at $5.50 per diem	1,709.81	5.50	1,727.00
Pilot, at $4.80 per diem	1,501.60	4.80	1,507.20
Draftsman, at $5 per diem	1,565.00	5.00	1,570.00
Mail messenger, at $2 per diem *	730.00	2.00	732.00
Messenger, at $2 per diem	626.00	2.00	628.00
Electrician, at $1,200 per annum	1,200.00	1,200.00	1,200.00
Messenger and lamplighter, at $2 per diem	626.00	2.00	628.00
Machinist in charge, at $4.50 per diem	1,389.37	.....	.....
Quarterman joiner, at $4.48 per diem	1,341.55	.....	.....
Rodman, at $2 and $2.48 per diem	771.86	.....	.....
Telegraph operator, at $3.28 per diem	1,010.13	.....	.....
Janitor, at $2.48 per diem	776.24	.....	.....
Total	17,500.81	.....	12,293.45
KEY WEST, FLA.			
Messenger, at $600 per annum	600.00	600.00	600.00
PORT ROYAL, S. C.			
Draftsman, at $5 per diem	1,505.00	.....	.....
Rodman, at $2.40 per diem	469.80	.....	.....
Inspector, at $2.40 per diem	408.90	.....	.....
Total	2,383.70	.....	.....
PORT ORCHARD, PUGET SOUND, WASHINGTON.			
Rodman, at $3 per diem	927.00	.....	.....
Assistant draftsman, at $5 per diem	1,565.00	.....	.....
Subinspectors, 7, at $3.50 per diem	4,044.13	.....	.....
Writer, at $3.25 per diem	1,016.65	.....	.....
Photographer, at $4 per diem	96.00	.....	.....
Total	7,648.78	.....	.....

* *Sundays included.*

Recapitulation of expenditures for certain employés for the fiscal year ending June 30, 1894, and estimates for the fiscal year ending June 30, 1896, per act approved January 30, 1885 (vol. 23, Stat. L., p. 295).

Navy-yards and stations.	Expenditures. 1893-'94.	Estimates. 1895-'96.
Portsmouth, N. H	$6,865.25	$7,307.00
Boston, Mass	6,984.36	5,393.28
Sacketts Harbor, N. Y	365.00	366.00
Brooklyn, N. Y	20,330.10	16,566.75
League Island, Pa	7,967.81	4,284.00
Washington, D. C	4,309.08	4,284.00
Norfolk, Va	9,887.67	8,570.89
Pensacola, Fla	1,930.00	1,932.00
Key West, Fla	600.00	600.00
Mare Island, Cal	17,500.81	12,293.45
Port Royal, S. C	2,383.70	.....
Port Orchard, Puget Sound, Washington	7,648.78	.....
Total	86,772.56	61,597.37

No. 9.—*Statement of the appropriations for the Bureau of Yards and Docks for the fiscal year ending June 30, 1894, and prior years, showing the amounts expended under each specific head of appropriation and the balances remaining unexpended June 30, 1894, as required by section 429, Revised Statutes.*

Appropriation for general maintenance, 1894	$230,000.00
Expended from July 1, 1893, to June 30, 1894	211,499.47
Balance on hand July 1, 1894	18,500.53
Which will be entirely expended.	
Appropriation for repairs and preservation, 1894	275,000.00
Expended from July 1, 1893, to June 30, 1894	261,987.26
Balance on hand July 1, 1894	13,012.74
Which will be entirely expended.	
Appropriation for civil establishment, 1894	61,494.54
Expended from July 1, 1893, to June 30, 1894	60,880.50
Balance on hand July 1, 1894	614.04
Which will revert to the Treasury.	
Appropriation for contingent, 1894	15,000.00
Expended from July 1, 1893, to June 30, 1894	7,458.13
Balance on hand July 1, 1894	7,541.87
After liabilities are paid balance will revert to Treasury.	
Appropriation for Naval Home, 1894	69,215.00
Expended from July 1, 1893, to June 30, 1894	58,730.09
Balance on hand July 1, 1894	10,484.91
After liabilities are paid balance will revert to Treasury.	
Appropriation, navy-yard, Portsmouth, N. H.:	
For coal pocket	6,500.00
For construction of boiler house for buildings Nos. 45 and 46	7,000.00
For construction of boiler house, building No. 10	15,000.00
	28,500.00
Expended from July 1, 1892, to June 30, 1894	13,778.62
Balance on hand July 1, 1894	14,721.38
Which will be entirely expended.	

Appropriation, navy-yard, Boston, Mass.:	
For new boiler and pumping machinery	$50,000.00
For constructing steel shears	12,000.00
For extensions and renewals in water-pipe system and repairs to wharves	5,000.00
For repairs to wharves	20,000.00
	87,000.00
Expended from July 1, 1890, to June 30, 1894	87,000.00
Appropriation, navy-yard, Brooklyn, N. Y.:	
For quay wall on cob dock	100,000.00
For quay wall extension on cob dock	30,000.00
For gate at Sands street	5,000.00
	135,000.00
Expended from July 1, 1890, to June 30, 1894	134,865.71
Balance on hand July 1, 1894	134.29
Which will be entirely expended	
Appropriation, navy-yard, Brooklyn, N. Y.:	
For extensions and improvements	593,860.33
Expended from July 1, 1892, to June 30, 1894	225,372.57
($20,000 being in hands of paymaster at New York.)	
Balance on hand July 1, 1894	368,487.76
Which will be entirely expended.	
Appropriation, navy-yard, League Island, Pa.:	
For dredging and filling in	75,000.00
For dredging and filling in and paving and improvement of grounds	25,000.00
For extending permanent sea wall	25,000.00
For west dry dock pier	87,441.62
For ripraps for protection wall	9,150.00
For construction of light retaining wall	25,000.00
For sewers and flushing tank	5,685.00
	252,276.62
Expended from July 1, 1890, to June 30, 1894	249,645.82
Balance on hand July 1, 1894	2,630.80
Which will be entirely expended.	
Appropriation, navy-yard, League Island, Pa.:	
For extension of protection wall	20,000.00
For extension of light retaining wall	15,000.00
For ripraps for Broad street wharf	6,500.00
For branch sewer	2,100.00
	43,600.00
Expended from July 1, 1892, to June 30, 1894	40,800.88
Balance on hand July 1, 1894	2,799.12
Which will be entirely expended.	
Appropriation, navy-yard, League Island, Pa.:	
For continuation of sea wall	20,000.00
For one pair shear legs	18,000.00
Toward the construction of east dry dock pier	40,000.00
	78,000.00
Expended from July 1, 1893, to June 30, 1894	45,318.56
Balance on hand July 1, 1894	32,681.44
Which will be entirely expended.	
Appropriation, navy-yard, Washington, D. C.:	
For dredging and filling in	5,000.00
For breech mechanism shop	15,000.00
	20,000.00
Expended from July 1, 1892, to June 30, 1894	20,000.00

Appropriation, navy-yard, Washington, D. C.:	
For new timber shed for ordnance purposes	$7,500.00
For conversion of mold loft building into a forge shop	8,000.00
For reconstruction of forge shop with foundations for crane columns	10,000.00
For one wrecking car with 15-ton crane attachment	2,500.00
For installation of electric lights in breech mechanism shop	2,500.00
	30,500.00
Expended from July 1, 1893, to June 30, 1894	19,232.03
Balance on hand July 1, 1894	11,267.97
Which will be entirely expended.	
Appropriation, navy-yard, Norfolk, Va.:	
For floating gate for granite dock	25,000.00
For coal shed	6,500.00
	31,500.00
Expended from July 1, 1893, to June 30, 1894	31,348.40
Balance on hand July 1, 1894	151.60
Which will be entirely expended.	
Appropriation, navy-yard, Norfolk, Va.:	
For railroad extension and system	15,000.00
Expended from July 1, 1890, to June 30, 1894	15,000.00
Appropriation, navy-yard, Norfolk, Va.:	
For extension of quay wall	15,000.00
For extension of water system	8,000.00
	23,000.00
Expended from July 1, 1893, to June 30, 1894	17,318.62
Balance on hand July 1, 1894	5,681.38
Which will be entirely expended.	
Appropriation, construction of dock, Port Royal, S. C.:	
Toward the construction of a timber dry dock	200,000.00
To continue the construction of a timber dry dock	150,000.00
For the completion of a timber dry dock	150,000.00
	500,000.00
Expended from July 1, 1890, to June 30, 1894	387,099.49
Balance on hand July 1, 1894	112,900.51
Which will be entirely expended.	
Appropriation for telephone line (under construction of dock)	1,500.00
Expended from July 1, 1892, to June 30, 1894	1,300.00
Balance on hand July 1, 1894	200.00
Which will be entirely expended.	
Appropriation, naval station, Port Royal, S. C.:	
For sewerage	846.00
For officers' quarters, $7,000, and $5,000 transferred	12,000.00
For boathouse	1,000.00
For barn	750.00
For completing officers' quarters, heretofore authorized	2,500.00
	17,096.00
Expended from July 1, 1893, to June 30, 1894	15,047.87
Balance on hand July 1, 1894	2,048.13
Which will be entirely expended.	

Appropriation, navy-yard, Mare Island, Cal.:	
For boat landings	$3,000.00
For widening gauge of railroad track	6,500.00
For extension of quay wall	25,000.00
For removal and reconstruction of return wall sectional dry-dock basin	11,285.24
For oil house for general storekeeper	8,000.00
For one 12-ton pillar wharf crane	3,800.00
For one locomotive for yard use	4,000.00
For straightening sea wall	20,000.00
	81,585.24
Expended from July 1, 1890, to June 30, 1894	76,219.56
Balance on hand July 1, 1894	5,365.68
Which will be entirely expended.	
Appropriation, navy-yard, Mare Island, Cal.:	
For dredging	20,000.00
For dry-air closet	4,000.00
For new carriage house and dirt stables	3,000.00
For changes in steam engineering buildings	4,797.00
For shed for bending slabs, rolls, and furnaces	6,381.00
For engine house for engine for construction and repairs	3,470.00
	41,648.00
Expended from July 1, 1893, to June 30, 1894	39,425.61
Balance on hand July 1, 1894	2,222.39
Which will be entirely expended.	
Appropriation, increase of the Navy:	
For 1 traveling crane of 40-tons capacity for dry dock at navy-yard, Mare Island, Cal	60,000.00
Expended from July 1, 1892, to June 30, 1894	26,535.21
Balance on hand July 1, 1894	33,464.79
Which will be entirely expended.	
Appropriation, adjustable stern dock for naval station, Key West, Fla.	30,000.00
Expended from July 1, 1889, to June 30, 1894	27,000.00
Balance on hand July 1, 1894	3,000.00
Which is held to pay reservation under the contract.	
Appropriation, increase of the Navy, traveling cranes:	
For 2 traveling cranes of 40-tons capacity for dry docks at Norfolk and New York navy-yards	100,000.00
Expended from March 2, 1891, to June 30, 1894	100,000.00
Appropriation, dry dock, Puget Sound, Washington:	
For purchase of tract of land for dry-dock site and construction of dry dock upon said land	210,000.00
To continue the construction of the dry dock	225,000.00
	435,000.00
Expended from July 1, 1891, to June 30, 1894	270,748.61
Balance on hand July 1, 1894	164,251.39
Which will be entirely expended.	
Appropriation, electric lighting of navy-yards	60,000.00
Expended from July 1, 1889, to June 30, 1894	60,000.00

No. 10.—Abstract and statement of offers received for contracts, for improvements, materials, and services coming under the cognizance of the Bureau of Yards and Docks, as required by section 429, Revised Statutes, for fiscal year ending June 30, 1894.

Offers for dry-dock pier at U. S. navy-yard, League Island, Pa., under advertisement dated July 7, 1893:		
Sanford & Brooks		$86,694.00
Jos. S. Allen		61,939.00
Wm. A. Mundy *		59,400.00
Offers for dredging at U. S. navy-yard, Mare Island, Cal., under advertisement dated July 12, 1893:		
H. Crusi *	per cubic yard	.18¾
John Hackett	do	.24
Offers for repairs to warf, section 1, at U. S. navy-yard, Boston, Mass., under advertisement dated August 22, 1893:		
Chas. A. Trumball and Wm. H. Ryan		7,585.00
Wm. L. Miller		3,845.00
Alex. McInnis & Co.*		2,995.00
Josiah Shaw		3,650.00
Offers for timber shed at U. S. navy-yard, Washington, D. C., under advertisement, dated September 9, 1893:		
W. W. Winfree		12,495.00
Youngstown Bridge Co.*		4,895.00
John E. Simms		5,936.00
Wm. Rothwell		8,034.00
Wm. O. Shaw		8,750.00
Geo. W. Morrow & Son		6,681.00
Chas. White & Co		9,600.00
Thos. J. Gilroy		6,889.00
The Berlin Iron and Bridge Co		5,605.00
C. Thomas & Son		9,156.00
Offers for repairs to wharf at U. S. navy-yard, Boston, Mass., under advertisement dated October 28, 1893:		
Wm. A. Mundy		17,500.00
Wm. L. Miller*		8,437.00
Benjamin Young		9,500.00
Alex. McInnis		8,975.00
W. S. Rendle & Co		15,390.00
Josiah Shaw		10,495.00
Jeremiah Cushman		11,915.00
Jos. Ross and John Harris		17,300.00
C. A. Trumball and Wm. H. Ryan		8,501.02
F. W. Kennick and E. M. Kennick		9,675.00
Offers for reconstruction of boiler shop, building No. 10, at U. S. navy-yard, Portsmouth, N. H., under advertisement dated October 19, 1893:		
Norcross Bros		$17,500.00
S. C. Forsaith Machine Co		13,940.00
Brown Ketcham Iron Works *		11,536.00
Holtzclaw Bros		13,458.00
Youngstown Bridge Co		12,136.00

Offers for enlargement of naval prison at U. S. navy-yard, Boston, Mass., under advertisement dated April 19, 1894:

	Section 1.	Section 2.
The Van Dorn Iron Works		$3,497.50
Dearborn Bros. & Co	$5,595.00	5,358.00
D. J. Donovan's Sons *	4,542.00	5,847.00
Wm. L. Miller	6,474.00	3,800.00

* Accepted.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Yards and Docks, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.			
One chief clerk (July 31, 1894)	$1,800.00		
One draftsman and clerk (same act)	1,800.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 3 (same act)	1,600.00		
One clerk of class 2 (same act)	1,400.00		
One clerk at $1,000 per annum (same act)	1,000.00		
One assistant messenger (same act)	720.00		
One laborer	660.00		
		$10,580.00	$10,580.00
NOTE.—The Chief of the Bureau of Yards and Docks reports, under the requirements of section 2, act of July 11, 1890 (26 Stats. 267), that one clerk at $1,000 is below a fair standard of efficiency, owing to old age and ill health, and that the efficient clerks of the Bureau are now doing his work. One clerk (typewriter) at $1,000, employed in the Bureau, is borne on the rolls of the Secretary's office.			
MAINTENANCE OF YARDS AND DOCKS, 1896.			
For general maintenance of yards and docks, namely: For freight; transportation of materials and stores; books, maps, models, and drawings; purchase and repair of fire engines; machinery; repairs on steam fire engines and attendance on the same; purchase and maintenance of oxen, horses, and driving teams; carts, timber wheels, and all vehicles for use in the navy-yards; tools and repairs of the same; postage on letters and other mailable matter on public service sent to foreign countries, and telegrams; stationery; furniture for Government houses and offices in navy-yards; coal and other fuel, candles, oil, and gas; cleaning and clearing up yards and care of buildings; attendance on fires, lights, fire engines, and apparatus; for incidental labor at navy-yards; water tax, tolls, and ferriage, rent of four officers' quarters at Philadelphia, Pa., pay of watchmen in navy-yards; awnings and packing boxes and advertising for yards and docks and other purposes (July 26, 1894)	250,000.00	250,000.00	250,000.00
CONTINGENT YARDS AND DOCKS, 1896.			
For contingent expenses that may arise at navy-yards and stations (same act)	15,000.00	15,000.00	15,000.00
REPAIRS AND PRESERVATION, 1896.			
For repairs and preservation at navy-yards and stations (same act)	400,000.00	400,000.00	300,000.00
		665,000.00	565,000.00
NAVAL HOME, PHILADELPHIA, PA., 1896.			
One superintendent (July 26, 1894)	600.00		
One steward (same act)	480.00		
One matron (same act)	360.00		
One chief cook (same act)	360.00		
One assistant cook (same act)	240.00		
One assistant cook (same act)	180.00		
One chief laundress (same act)	192.00		
Four laundresses, each at $168 (same act)	672.00		
Four scrubbers, each at $168 (same act)	672.00		
Eight waiters, each at $168 (same act)	1,344.00		
Eight laborers, each at $240 (same act)	1,920.00		
One master at arms (same act)	480.00		
Two house corporals, each at $300 (same act)	600.00		
One engineer to run elevator (same act)	600.00		
One stable keeper and driver (same act)	360.00		
One barber (same act)	360.00		
One painter (same act)	600.00		
One carpenter (same act)	845.00		
		10,865.00	10,865.00

Estimates of appropriations required for the service of the fiscal year ending June 30 1896, by the Bureau of Yards and Docks, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
NAVAL HOME, PHILADELPHIA, PA., 1896—continued.			
For water rent and gas (same act)	$2,400.00		
For cemetery, burial expenses, and headstones (same act)	350.00		
For improvement of grounds (same act)	500.00		
For repairs to buildings, furnaces, grates, ranges, furniture, and repairs of furniture (same act)	7,000.00		
For music in chapel (same act)	600.00		
For transportation of indigent and destitute beneficiaries to the Naval Home (same act)	500.00	$11,350.00	$12,500.00
For support of beneficiaries (same act)	57,100.00	57,100.00	57,100.00
		79,315.00	80,465.00
CIVIL ESTABLISHMENT, YARDS AND DOCKS, 1896.			
Navy-yard, Portsmouth, N. H.:			
One clerk, at $1,400 per annum (July 26, 1894)	1,400.00		
One mail messenger, at $2 per diem* (same act)	732.00		
One messenger, at $600 per annum (same act)	600.00		
One foreman laborer and head teamster, at $4 per diem*	1,464.00		
One janitor, at $600 per annum (same act)	600.00		
One pilot, at $3 per diem* (same act)	1,098.00		
One foreman mason, when required, at $4.50 per diem (same act)	1,413.00	7,307.00	7,293.50
Navy-yard, Boston, Mass.:			
One clerk, at $1,400 per annum (same act)	1,400.00		
One foreman laborer, at $4 per diem (same act)	1,256.00		
One messenger to commandant, at $1.76 per diem (same act)	552.64		
One messenger, at $1.76 per diem (same act)	552.64		
One mail messenger, at $2 per diem* (same act)	732.00		
One writer, at $900 per annum (same act)	900.00	5,393.28	5,383.76
Naval station, Sackett's Harbor, New York:			
One shipkeeper, at $366 per annum (same act)	366.00	366.00	365.00
Naval station, Key West, Fla.:			
One mail messenger, at $600 per annum (same act)	600.00	600.00	600.00
Navy-yard, Brooklyn, N. Y.:			
One clerk at $1,400 per annum (same act)	1,400.00		
One writer at $1,017.25 per annum (same act)	1,017.25		
Two masters of tugs at $1,500 each per annum (same act)	3,000.00		
Two writers at $900 per annum each (same act)	1,800.00		
One foreman laborer at $4.50 per diem (same act)	1,413.00		
One mail messenger at $2 per diem * (same act)	732.00		
Two messengers at $2.25 each per diem (same act)	1,413.00		
One draftsman at $5 per diem (same act)	1,570.00		
One quarterman at $3 per diem (same act)	942.00		
One superintendent of teams or quarterman at $4 per diem (same act)	1,256.00		
One messenger to commandant at $2.25 per diem* (same act)	823.50		
One electrician at $1,200 per annum (same act)	1,200.00	16,566.75	16,541.50
Navy-yard, League Island, Pa.:			
One clerk at $1,400 per annum (same act)	1,400.00		
One writer and telegraph operator at $1,000 per annum (same act)	1,000.00		
One messenger at $2 per diam (same act)	628.00		
One foreman laborer at $4 per diem (same act)	1,256.00	4,278.00	4,278.00
Navy-yard, Washington, D. C.:			
One clerk, at $1,400 per annum (same act)	1,400.00		
One messenger, at $2 per diem (same act)	628.00		
One foreman laborer, at $1,256 per annum (same act)	1,256.00		
One electrician, at $1,000 per annum (same act)	1,000.00	4,284.00	4,278.00
Navy-yard, Norfolk, Va.:			
One clerk, at $1,400 per annum (same act)	1,400.00		
One writer, at $1,017.25 per annum (same act)	1,017.25		
One writer, at $1,000 per annum (same act)	1,000.00		
One foreman laborer, at $4 per diem (same act)	1,256.00		
One mail messenger, at $2 per annum (same act)*	732.00		
Two messengers, at $2 each per diem (same act)	1,256.00		
One pilot, at $2.26 per diem (same act)	709.64		
One electrician, at $1,200 per annum (same act)	1,200.00	8,570.89	8,558.63

* Including Sundays.

***Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Yards and Docks, Navy Department*—Continued.**

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total. amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
CIVIL ESTABLISHMENT, YARDS AND DOCKS, 1896—continued.			
Navy-yard, Pensacola, Fla.:			
One clerk, at $1,200 per annum (same act)	$1,200.00		
One messenger, at $2 per diem (same act)*	732.00	$1,932.00	$1,930.00
Navy-yard, Mare Island, California:			
One clerk at $1,400 per annum (same act)	1,400.00		
One writer at $1,017.25 per annum (same act)	1,017.25		
One foreman mason at $6 per diem (same act)	1,884.00		
One foreman laborer at $5.50 per diem (same act)	1,727.00		
One pilot at $4.80 per diem (same act)	1,507.20		
One draftsman at $5 per diem (same act)	1,570.00		
One mail messenger at $2 per diem * (same act)	732.00		
One messenger at $2 per diem (same act)	628.00		
One electrician at $1,200 per annum (same act)	1,200.00		
One messenger and lamp-lighter at $2 per diem (same act)	628.00	12,293.45	12,266.15
		61,597.37	61,494.54
NAVY-YARDS AND STATIONS.			
Navy-yard, Boston, Mass.:			
For rebuilding wharves (submitted July 26, 1894)	15,000.00	15,000.00	15,000.00
Navy-yard, Brooklyn, N. Y.:			
For pumping plant for granite dock (submitted; same act)	40,000.00		
For grading, paving, sidewalks, and sewers (submitted; same act)	20,000.00		
For "construction and repair" workshop, near timber dry dock (submitted; same act)	85,240.00		
For rebuilding "construction and repair" shipwright shed, No. 44 (submitted; same act)	6,534.00		
For putting "equipment" paint shop in good condition (submitted; same act)	3,575.00		
For dredging (submitted; same act)	55,000.00		
For quay wall in Whitney Basin, total estimated cost, $111,855 (submitted; same act)	25,000.00		
For quay wall on Cob Dock, total estimated cost, $123,500 (submitted; same act)	15,000.00		
For heating apparatus for "equipment" rigging loft (submitted; same act)	1,286.00		
For extension of railroad system (submitted; same act)	10,000.00	261,635.00	140,000.00
Navy-yard, League Island, Pennsylvania:			
For 200 lineal feet of sea wall, continuation (submitted; same act)	10,000.00		
For 2,000 lineal feet of light retaining wall continuation, (submitted; same act)	10,000.00		
For dredging (submitted; same act)	10,000.00		
For artesian well (submitted; same act)	9,000.00		
For sidewalks (submitted; same act)	3,500.00		
For one deck scow (submitted; same act)	2,000.00	44,500.00	81,900.00
Navy-yard, Washington, D. C.:			
For extension of quay wall (submitted; same act)	4,569.00		
For extension of railroad track to store No. 2 (submitted; same act)	3,250.00		
For roundhouse for yard locomotive and wrecking car (submitted; same act)	4,500.00		
For extension of electric-light plant (submitted, same act)	5,000.00		
For hydrants to conform to city standard (submitted; same act)	1,560.00		
For new iron roof and repairs to walls of foundry (submitted; same act)	33,000.00		
For conversion of museum (building No. 6) into 2 officers' quarters (submitted; same act)	8,000.00	59,879.00	50,044.00

* Including Sundays.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896 by the Bureau of Yards and Docks, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
NAVY-YARDS AND STATIONS.—continued.			
Navy-yard, Norfolk, Va.:			
For extension of quay wall (submitted; same act)	$20,000.00		
For sand lighter (submitted; same act)	2,000.00		
For derrick car (submitted; same act)	1,000.00		
For repairs to granite dock (submitted; same act)	30,000.00		
For 1 deck scow (submitted; same act)	2,000.00		
		$55,000.00	$110,365.77
Navy-yard, Mare Island, California:			
For quay wall between ferry slip and dry dock, estimated cost $52,793.48 (submitted; same act)	10,000.00		
For grading and paving about stone dry dock, estimated cost $30,445.03 (submitted; same act)	10,000.00		
For enlarging entrance to stone dry dock (submitted; same act)	20,736.00		
For new caisson for stone dry dock (submitted; same act)	53,000.00		
For dredging (submitted; same act)	10,000.00		
For 3 steam capstans for dry dock (submitted; same act)	5,971.00		
For railroad scales (submitted; same act)	1,640.00		
For improvement of coppersmith shop, "steam engineering" (submitted; same act)	4,527.00		
For yard roads (submitted; same act)	5,000.00		
		120,874.00	29,019.00
Naval station, Port Royal, S. C.:			
For roadways (submitted, same act)	5,572.00		
For grading and drainage (submitted, same act)	6,000.00		
For extension of hydrant system (submitted, same act)	1,385.00		
For boundry fence (submitted, same act)	1,200.00		
For "construction and repair" shop (submitted, same act)	80,000.00		
For storage cisterns (submitted, same act)	3,758.00		
		97,915.00	36,889.42
Dry dock, Algiers, La:			
For commencing dry dock; total estimated cost, $1,250,000 (submitted, same act)	50,000.00	50,000.00	23,025.03
Naval station, Key West, Fla.:			
For purchase of additional lot, $20,000, or so much as may be necessary (submitted, same act)	20,000.00		
For coaling pier (submitted, same act)	40,000.00		
		60,000.00	10,000.00
Dry dock, Puget Sound, Washington:			
For continuation of dry dock, dredging, office building, and officers' quarters, to be made immediately available (submitted, same act)	275,000.00		
For roadways (submitted, same act)	5,000.00		
		280,000.00	6,079.83
Act Aug. 18, 1894			45,000.00
		1,044,803.00	547,323.05

REPORT

OF

THE CHIEF OF THE BUREAU OF EQUIPMENT.

NAVY DEPARTMENT, BUREAU OF EQUIPMENT,
Washington, D. C., October 1, 1894.

SIR: I have the honor to submit the report of this Bureau for the fiscal year ending June 30, 1894, with the estimates for the fiscal year ending June 30, 1896.

The report includes the business operations of the Bureau, and appended are the reports of the Superintendent of the Naval Observatory, of the Superintendent of the Nautical Almanac, of the inspector of electric lighting, and of the superintendent of compasses.

The following were the appropriations for the Bureau and its branches:

Equipment of vessels	$925,000
Contingent equipment	12,000
Civil establishment	19,025
Increase of the Navy equipment	250,000
Naval Observatory	31,200
Nautical Almanac	9,400

There will be a deficiency of about $30,000 in the appropriation "Equipment of vessels" due to the fact that $191,291 more was expended for coal in the past year than in the year previous. This can not be called strictly a deficiency, as under the law the purchase of steaming coal is not necessarily limited, being governed, as is the purchase of provisions, by the necessities of the public service.

There will be a deficiency of about $500 in contingent.

The following was manufactured at the Boston navy-yard at a cost for material, $47,994.29; for labor, $55,016.31:

In the ropewalk:		
Manila rope	pounds	261,762
Hemp rope	do	44,187
Bolt rope	do	17,632
Steel wire and seizing	do	62,851
Hambroline, marline, houseline, codline, etc	do	43,097
In forge, anchor, and chain shops:		
Chain cables of various sizes, and appendages	pounds	297,606
One hundred and six boat and kedge anchors	do	7,263
Six anchors were altered to the standard pattern	do	26,957
Cat and ground chains, cathooks, grapnels, and buoys	do	23,881
Iron rolled	do	458,099
In machine shop and foundry:		
Galley parts	pounds	27,227

There was expended in the sail lofts of the several navy-yards the sum of $55,854.93 for labor and $40,699.10 for material, and in the rigging lofts $35,800.58 for labor and $26,985.94 for material.

Hemp for the manufacture of cables, towlines, and rope, to the amount of $28,737.24, was purchased during the fiscal year as follows:

	Tons.	Cost.
Russian hemp	28 $\frac{373}{2000}$	$8,742.45
Manila hemp	100 $\frac{1}{2000}$	16,510.54
American hemp	20 $\frac{482}{2000}$	3,484.25

The following material was on hand at the Boston navy-yard June 30, 1894, for manufacture of rope:

American hemp	pounds	57,351
Manila hemp	do	70,445
Russian hemp	do	178,003
Steel wire	do	102,615

There were purchased at home 42,190 tons of coal, costing $178,163.58; of which quantity 9,505 tons were purchased on the Pacific Coast at an average cost of $7.02 per ton and 32,685 tons on the Atlantic Coast at average cost of $3.33 per ton.

There was expended abroad for equipment the sum of $532,788.55. Of this amount $462,192.38 was expended for 52,146 tons of coal, an average cost per ton of $8.86.

The sum of $315,141.28 was expended for labor at the several navy-yards in equipping ships of the Navy.

Of a total of 56,722 tons coal used by the new ships of the Navy during the year, 40,521 tons, or 71 per cent, was for steaming purposes, and 16,201 tons, or 29 per cent, was for auxiliary purposes, under which latter head are included electric lighting, distilling, heating, flushing water-closets, cooking, ventilation, and steam-cutter service. These percentages are the same as those of last year.

Much difficulty has been met with in obtaining the desired quality of iron for chain cables. The Bureau was fortunate in finding some 230 tons of old ships' tanks, which were cut up and rolled for this purpose.

A board of officers, composed of Lieut. Commander Dunlap and Lieuts. Stanton and Niblack, carried out a careful and exhaustive series of tests with respect to an improvement in our night signals; the suggestions of the board have been adopted, with a great gain in rapidity and certainty in the use of the signals and in decrease of space occupied by the signal outfit.

A new boat compass, the outcome of suggestions of Lieut. Perkins has been adopted. I regard it as a very great improvement upon the former one in use.

Aluminum binnacles, weighing less than one-third the former of bronze, are being tested in service and promise to meet every requirement.

A new form of life-preserver, enabling one to be supplied for each person on board, has been adopted.

Very respectfully,

F. E. CHADWICK,
Chief of Bureau of Equipment.

The SECRETARY OF THE NAVY.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Equipment, Navy Department.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.			
One chief clerk (appropriated, R. S., p. 70, sec. 416; July 26, 1894, pamphlet edition, legislative and executive bill, p. 33)	$1,800		
One clerk of class 2 (same act)	1,400		
One clerk of class 2, submitted in lieu of one of class 1, now authorized (submitted, same act)	1,400		
Two copyists, at $900 each (appropriated, same act)	1,800		
One assistant messenger (same act)	720		
One laborer (same act)	660		
		$7,780	$7,580
EQUIPMENT OF VESSELS.			
For purchase of coal for steamers' and ships' use, including expenses of transportation, storage, and handling the same; hemp, wire, iron, and other materials for the manufacture of cordage, anchors, cables, galleys, and chains; canvas for the manufacture of sails, awnings, hammocks, and other work; water for steam launches; stationery for commanding and navigating officers of ships, equipment officers on shore and afloat, and for the use of courts-martial on board ships, and for the purchase of all other articles of equipment at home and abroad, and for the payment of labor in equipping vessels and manufacture of equipment articles in the several navy-yards; foreign and local pilotage and towage of ships of war; services and materials in repairing, correcting, adjusting, and testing compasses on shore and on board ship; nautical and astronomical instruments, and repairs to same; libraries for ships of war; professional books and papers, and drawings and engravings for signal books; naval signals and apparatus, namely, signals, lights, lanterns, rockets, running lights; compass fittings, including binnacles, tripods, and other appendages of ship's compasses; logs and other appliances for measuring the ship's way, and leads and other appliances for sounding; lanterns and lamps and their appendages for general use on board ship for illuminating purposes, and oil and candles used in connection therewith; bunting and other materials for making and repairing flags of all kinds; photographic instruments and materials; musical instruments and music; and installing and maintaining electric lights and interior signal communications on board vessels of war (appropriated July 26, 1894; pamphlet edition, naval bill, p. 5)	.....	1,278,000	1,090,000
CONTINGENT.			
For freight and transportation of equipment stores, packing boxes and materials, printing, advertising, telegraphing, books and models; stationery for the Bureau; furniture for equipment offices in navy-yards; postage on letters sent abroad; ferriage, ice, lighterage of ashes, and emergencies arising under cognizance of the Bureau of Equipment unforeseen and impossible to classify (appropriated July 26, 1894, pamphlet edition of naval bill, pp. 5, 6)	.....	12,000	12,000
INCREASE OF THE NAVY.			
Toward the completion of the equipment-outfit of the new vessels heretofore authorized by Congress (appropriated March 2, 1891; July 19, 1892; March 3, 1893)	.....	142,500	.....
CIVIL ESTABLISHMENT.			
Navy-yard, Portsmouth, N. H.:			
One clerk (appropriated July 26, 1894; pamphlet edition, naval bill, p. 5)	1,200		
One clerk (same act)	1,000		
Navy-yard, Boston, Mass.:			
One superintendent of ropewalk (same act)	1,875		
One clerk (same act)	1,400		
One clerk (same act)	1,300		
One writer (same act)	950		

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Equipment, Navy Department—Continued.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
CIVIL ESTABLISHMENT—continued			
Navy-yard, New York:			
One clerk (same act)	$1,400		
One clerk (same act)	1,200		
One writer (same act)	1,000		
One storekeeper (same act)	900		
Navy-yard, League Island, Pennsylvania:			
One clerk (same act)	1,200		
Navy-yard, Norfolk, Va.:			
Two clerks, at $1,200 each (same act)	2,400		
Navy-yard, Washington, D. C.:			
One clerk (same act)	1,000		
Navy-yard, Mare Island, Cal.:			
One clerk (same act)	1,200		
One clerk (same act)	1,000		
		$19,025	$19,025

Schedule of bids for coal and provender at the new Naval Observatory opened May 7, 1894.

CLASS 1—*Coal:*	
Mayfield & Hieston	$4,680.00
J. Edward Chapman	*4,617.00
Executors of G. L. Sheriff	5,031.00
CLASS 2—*Provender:*	
W. M. Galt & Co	385.50
S. S. Daish & Son	*342.25
Dannenhower & Co	381.30

REPORT OF THE SUPERINTENDENT NAVAL OBSERVATORY.

U. S. NAVAL OBSERVATORY,
GEORGETOWN HEIGHTS,
Washington, D. C., September 10, 1894.

SIR: I have the honor to submit herewith the annual report of the operations of the U. S. Naval Observatory during the year ending June 30, 1894, together with a set of estimates for the support of this establishment for the fiscal year ending June 30, 1896. (Appendix A.)

During the past year regulations for the organization and government of the Naval Observatory have been established by the Navy Department.

Lieut. A. G. Winterhalter, U. S. Navy, was detailed by the Navy Department to establish and conduct the Naval Observatory exhibit at the World's Columbian Exposition at Chicago, Ill.

26-inch equatorial telescope.—Prof. S. J. Brown, U. S. Navy, in charge Asst. Astronomer H. M. Paul, assistant.

The construction of large, complicated, and delicate equatorials is in many respects a new industry in the United States. To put this telescope in working order, and make the changes and additions inherent to the mounting and its accessories, required much care and

*Awarded.

thought, together with mechanical skill of a high order, and necessarily consumed a considerable amount of time.

Adjustments and changes have been made in the following parts, namely:

The filar-micrometer and the large tube.
The dial indicator on the pier and its connection to the elevating floor.
The control valves for raising and lowering the elevating platform.
The rope pulleys for rapid handling and setting of the telescope.
The adjustment of the polar axis to the plane of the meridian.
The designing of electric lamps, the entire wiring of the instrument for electric illumination and for electric control of the driving clock, and the arrangement of an observing-key for the chronograph at the eye end of the telescope.

Other minor changes have also been completed.

Some of these alterations were made by the makers; but the electric lighting, driving-clock-control and chronograph-key systems were planned and the work performed at the Observatory.

Some minute irregularities exist in the action of the driving-clock connections upon the telescope, and much time has been expended in finding their origin.

The spectroscope has been so modified that it is now readily attached and detached from the telescope.

A number of observations of Saturn's satellites have been made, and preliminary work is commenced with the spectroscope.

Prof. Asaph Hall, U. S. Navy (retired), the distinguished astronomer who discovered the satellites of Mars, has kindly consented to make further observations of them during the opposition of that planet in November next.

12-inch equatorial telescope.—Prof. Edgar Frisby, U. S. Navy, in charge.

The 12-inch object glass of this instrument is not yet made, as the appropriation for that purpose ($2,000) was not available at the close of the fiscal year. A 9.6-inch objective has, however, been temporarily fitted and used during the past year. The adjustment of this new instrument, involving minor mechanical changes, principally in the form of the micrometer, and generally getting the telescope into good working condition, including the necessary observations for finding the values of the wire intervals in right ascension and declination, and the value of the micrometer screw in seconds of arc, occupied considerable time before the instrument was regarded as satisfactory. Although a number of asteroids, and comet C, were observed prior to April, 1894, regular work with the instrument was not commenced until that date. For two nights each week this telescope has been regularly devoted to entertaining visitors; 3,200 passes were issued, and in addition, a number of distinguished persons were received at other times. On other clear nights during the months of April, May, and June comet Gale, the asteroid Germania, and an emersion of α Virginis from the moon were observed.

9-inch transit circle.—Asst. Astronomer A. N. Skinner in charge. Computers F. B. Littell and Theo I. King, assistants.

The contract for this instrument will not be completed until a proper object glass is furnished by the contractor. The present objective gives sharp definition over so small a field that observations only over the central wires are satisfactory. Considerable time was occupied in ascertaining the defects of this objective; nevertheless, pending the arrival of its substitute, work was commenced on the German Astronomical Society's zone,—13° 50′ to —18° 10′, in January, 1894. From that date to June 30, 1894, 55 zones have been observed, comprising

4,444 zone stars and 496 zero stars. The zero stars have been reduced through zone 40. All the chronographic records of transits have been read off and the reduction of the zone stars to the mean thread commenced.

Prime vertical instrument.—Asst. Astronomer George A. Hill in charge. Observations for declination were made upon α Lyræ on all clear nights, and on μ Andromedæ, ρ Persei, θ Aurigæ, α Canum Venaticorum, and γ Boötis at the time of maximum aberration of these stars.

6-inch transit circle.—This new meridian circle was contracted for under specifications on March 20, 1893. The time for its completion is extended till March 1, 1895.

5⅓ inch meridian transit instrument, chronometer, and time service.—Lieut. L. C. Heilner, U. S. Navy, in charge. Computer Frank E. Dennett, assistant.

Observations have been taken every clear night, and the necessary reductions for clock corrections in connection with the time service and chronometer comparisons have been made.

There are at present in the chronometer room ready for issue 31 standard chronometers, 6 hacks, 3 sidereal break-circuit chronometers, and 1 mean-time break-circuit chronometer.

During the past year 35 standard chronometers, 12 hack chronometers, 7 comparing watches, 6 stop watches, and 9 maximum and minimum thermometers have been issued to naval vessels. Six standard chronometers were forwarded by the U. S. S. *Charleston* to the Mare Island navy-yard, also 6 comparing watches; 1 mean-time break-circuit chronometer was transferred to the Branch Hydrographic Office, Chicago, and 1 chronometer has been issued to the Branch Hydrographic Office, Baltimore, Md.

The Observatory has received 17 standard chronometers, 10 hacks, and 6 comparing watches from naval vessels; 1 chronometer and 7 hacks from Mare Island navy-yard; 2 chronometers from the Nautical Almanac Office; 1 chronometer (Losada, No. 3727) from the Spanish caravals at the World's Columbian Exposition, and 12 chronometers purchased after undergoing the rigid test required by specifications.

Twenty-five standards and 10 hacks have been repaired and returned to the Observatory. Twenty-seven standards and 4 hack chronometers are now undergoing repairs.

The new temperature room for the trial and testing of chronometers has proved satisfactory. The exacting and responsible routine of this department involves continuous work, both night and day, from the officer in charge and his assistant.

The time service continues to give satisfaction to the public. A time ball has been established at Chicago, and during the year requests have been received for a similar plant at other places. The noon signal has been transmitted daily with the exception of Sundays, and the apparatus for transmission of time has worked satisfactorily and without interruption. A new sidereal clock was purchased, and a mean-time clock recently constructed is now under trial.

Magnetic Observatory.—Lieut. C. C. Marsh, U. S. Navy, in charge. Occasional assistant, J. N. James, electrician.

The work in the magnetic department for the past year has been as follows: The summer and fall of 1893 were occupied in finishing the building and vault; in constructing the several piers necessary for the instruments now on hand and those that it was seen would soon be

required; in concreting the floor of the basement and tunnel, and in laying ventilating and heating pipes, etc.

The regular observations began in January, 1894, since which time the records have been carried on continuously, losing unavoidably only a few hours.

As this is a new station it was thought best to make absolute determinations of the magnetic elements more frequently than usual, and accordingly, such determinations have been made twice a day for the declination, and four times a week for the inclination and horizontal force.

Better results are anticipated from the new instruments about to be purchased, but the appropriation for them was not available until after July 1, 1894.

Photography.—Mr. Charles T. Fellows, photographer in charge.

The photographic building and photoheliograph are not yet completed, owing to the want of funds. It is, however, contemplated that systematic observations of sun spots will be commenced shortly. In the programme of this work it is proposed to take sun photographs, daily, when practicable, and to accumulate as much data as possible for the advancement of solar physics. Photographic work with an equatorially mounted star camera will also be commenced at an early date.

LIBRARY.

The library is under the supervision of a committee composed of Prof. William Harkness, Prof. J. R. Eastman, and Assistant Librarian William D. Horigan, Mr. Horigan acting as librarian.

The contents of the library at the beginning and end of the fiscal year 1893–'94, with the accessions during the year, as shown by the accession book, were as follows:

	Volumes.	Pamphlets.	Total.
Contents 1893, June 30	14,100	3,204	17,304
Accessions during 1893–'94	396	59	455
Contents 1894, June 30	14,496	3,263	17,759

Of the 455 accessions, 263 were received as exchanges and 192 were purchased.

The following publications have been distributed to the regular exchange lists:

The Annual Report of the Superintendent for 1893.
The Washington Observations for the year 1889.
Magnetic Observations for 1892.
Meteorological Observations and Results for 1889.
1890 Appendix 1.—Gilliss's Zone Catalogue.

MISCELLANEOUS REMARKS.

The preparation of specifications for the new meridian circle (6-inch), for the 9-inch transit circle objective, for sextants, octants, binocular and spy glasses, and the inspection of nautical and astronomical instruments purchased and repaired during the year have required study, thought, and the solving of complex problems. This work, together with drafting many technical letters, has occupied the valuable services

of Prof. William Harkness, U. S. Navy, both in and out of office hours.

The work of preparing the data for the transit circle star catalogue, embodying the results of the observations from 1866 to 1891, or in other words, all observations made with that instrument at the old Naval Observatory, excepting those of the moon and planets, has been carried on by Prof. J. R. Eastman, U. S. Navy, during the past twelve months and is now nearly completed. It is contemplated to assign this astronomer to duty in charge of fundamental observations with the new meridian circle as soon as it is mounted.

The tedious and troublesome work of reducing and preparing the Gilliss zones has been completed by Prof. Edgar Frisby, U. S. Navy, and Prof. S. J. Brown, U. S. Navy, and the catalogue is now in print.

In addition to making daily computations credit is due computers King, Littell, and Dennett for performing night work as observers, or assistants to the astronomer in charge of the German zone observations.

Attention is invited to House Ex. Doc. No. 46, Fiftieth Congress, second session, and estimates for an appropriation for the purchase of a photographic telescope and pointer and the construction of the necessary buildings for charting the sky, are again submitted.

PERSONNEL.

Prof. Simon Newcomb, U. S. Navy, superintendent of the Nautical Almanac Office, entered the Navy in 1861 and retires in 1897.

Prof. William Harkness, U. S. Navy, entered the Navy in 1863, since which date he has been engaged in astronomical work. He retires in 1899.

Prof. J. R. Eastman, U. S. Navy, has been engaged on astronomical work since 1865, and retires in 1898.

Prof. Edgar Frisby, U. S. Navy, received his appointment in 1878, after ten years of service at the Naval Observatory. He retires from active duty in 1899.

Prof. S. J. Brown, U. S. Navy, a graduate of the Naval Academy, was appointed professor of mathematics in 1883, and has been engaged in astronomical work since that date. He retires in 1916.

The remainder of the twelve professors of mathematics, U. S. Navy, are not regarded as astronomers.

Unless, therefore, the corps of professors of mathematics, U. S. Navy, is reorganized, the Naval Observatory will in the near future have but one astronomer available for duty.

Asst. Astronomer A. N. Skinner ($2,000) has been at the Naval Observatory twenty-four consecutive years.

Asst. Astronomer H. M. Paul ($1,800) has been attached to the Naval Observatory with intermission sixteen years.

Asst. Astronomer George A. Hill ($1,800) was employed as computer for three years and in his present position over one year.

Computers Frank E. Dennett, Frank B. Littell, and Theo. I. King were appointed in 1891, Computer Ernest A. Boeger in 1893, and Computer William M. Brown in 1894. ($1,200 each.)

The following table presents the personnel necessary to conduct the work at the U. S. Naval Observatory:

Detail.	Line officers.	Professors of mathematics.	Assistant astronomers.	Computers.
Superintendent's office	2	1	.....	*1
26 inch equatorial	.....	1	1	.....
12-inch equatorial	.....	1	.....	.....
6-inch transit circle	.....	1	.....	1
9-inch transit circle	.....	1	3	5
5⅓-inch transit instrument, chronometer and time service	2	.....	.....	1
Prime vertical instrument	.....	.....	1	.....
Magnetic instruments	2	.....	.....	.....
Nautical instruments and storekeeper	1	.....	.....	.....

* Also 1 clerk and 1 copyist-typewriter.

Present Observatory staff.—Capt. F. V. McNair, U. S. Navy, superintendent. Commander Joshua Bishop, U. S. Navy, assistant to superintendent. Lieut. L. C. Heilner, U. S. Navy, 5⅓-inch transit instrument, chronometer and time service. Lieut. C. C. Marsh, U. S. Navy, magnetic establishment. Prof. of Mathematics William Harkness, U. S. Navy, special duty, transit of Venus; chief astronomical assistant to the superintendent. Prof. of Mathematics J. R. Eastman, U. S. Navy, fundamental work, 6-inch meridian transit circle (under contract). Prof. of Mathematics Edgar Frisby, U. S. Navy, 12-inch equatorial telescope. Prof. of Mathematics S. J. Brown, U. S. Navy, 26-inch equatorial telescope. Asst. Astronomer A. N. Skinner, differential work, 9-inch transit circle. Asst. Astronomer F. M. Paul, assistant, 26-inch equatorial telescope. Asst. Astronomer George A. Hill, prime vertical instrument. Computers Frank B. Littell and Theo I. King, assistants, 9-inch transit circle. Computers Ernest A. Boeger and William M. Brown, computation. Computer Frank E. Dennett, assistant, 5⅓-inch transit instrument, and chronometer and time service. Clerk Thomas Harrison, correspondence and accounts. Mr. Robert H. Coker, copyist-typewriter.

Whenever there are an insufficient number of line officers on duty at the Naval Observatory competent to care for the chronometer and time service, it is manifestly imperative to assign professors, assistant astronomers, or computers for that work.

Very respectfully,

F. V. McNair,
Captain U. S. Navy, Superintendent of Naval Observatory.

The Chief of the Bureau of Equipment,
Navy Department.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the U. S. Naval Observatory.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES, NAVAL OBSERVATORY.			
One assistant astronomer (R. S., p. 27, sec. 167; Aug. 5. 1882, vol. 22, p. 245, sec. 1, July 31, 1894)	$2,000		$2,000
Two assistant astronomers, at $1,800 each (same acts)	3,600		3,600
One clerk of class four (same acts)	1,800		1,800
One instrument-maker (same acts)	1,500		1,500
One electrician (same acts)	1,500		1,500
One photographer (same acts)	1,200		1,200
Five computers, at $1,200 each (same acts)	6,000		6,000
One assistant librarian (same acts)	1,200		1,200
One copyist (same acts)	900		900
One skilled laborer, foreman and captain of the watch (same acts)	1,000		1,000
One carpenter (same acts)	1,000		1,000
One engineer (same acts)	1,000		1,000
One skilled laborer (same acts)	720		720
Two firemen, at $720 each (same acts)	1,440		1,440
Six watchmen, at $720 each (same acts)	4,320		4,320
One elevator conductor (same acts)	720		720
Eleven laborers, at $660 each (same acts)	7,260		7,260
Total		$37,160	37,160
CONTINGENT AND MISCELLANEOUS EXPENSES.			
Miscellaneous computations (July 31, 1894)	1,200		1,200
Professional and scientific books, periodicals, engravings, photographs, fixtures and supplies for the library, and binding for the same (increase of $1,000 submitted) (same act)	2,000		1,000
NOTE.—The increase for the library is requested to complete imperfect sets of important scientific transactions and periodicals, and to bring and keep up to date the binding of the library. The binding for the library is three years in arrears. More than 1,000 unbound volumes are on hand, and the annual accessions of unbound books and periodicals amount to 400 or 500 volumes.			
Apparatus and instruments, and repairs of the same (same act)	2,500		2,500
Repairs to buildings, fixtures, and fences; furniture, gas, chemicals, and stationery; freight (including transmission of public documents through the Smithsonian exchange), foreign postage, and expressage; plants, fertilizers, and all contingent expenses (increase of $1,000 submitted) (same act)	3,500		2,500
NOTE.—The amount appropriated March 3, 1891, for 1891-'92 at the old Observatory was $4,550; the amount for 1895 is inadequate.			
Fuel, oil, grease, tools, pipe, wire, and other materials needed for the maintenance and repair of boilers, engines, heating apparatus, electric lighting and power plant, and water-supply system; purchase and maintenance of teams; material for boxing nautical instruments for transportation; paints; telegraph and telephone service, and incidental labor (increase of $500 submitted) (same act)	8,000		7,500
NOTE.—Approximate estimates for coal, 900 tons at $6.00 per ton, $5,400. The sum remaining, appropriation 1895, $2,100, is inadequate for supplies for engines, pumps, and electric-light plant; repairs to 3 boilers, 2 engines, 2 dynamos, pumps, heating and water systems; purchase and maintenance of teams, paints, etc., telegraph and telephone service; incidental labor; material for boxing nautical instruments.			
Total		17,200	14,700
Public works, under the Navy Department.			
GROUNDS AND ROADS—NEW NAVAL OBSERVATORY.			
For continuing grading, extending roads and paths, clearing and improving grounds of New Naval Observatory, and filling ravine contiguous to boiler house to Massachusetts avenue extended, $12,000, to be immediately *available. (July 26, 1894.)*		12,000	12,000

:tes of appropriations required for the service of the fiscal year ending June 30, 1896, by the U. S. Naval Observatory—Continued.

ailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
NEW INSTRUMENTS.			
purchase of a photographic telescope and pointer, nstruction of building, dome, and piers, mounting ope, and for material for photographic work,). (Submitted.)	.....	$50,000	$11,956
.—Recommended by my predecessor, Capt. R. L. m, and approved by the Hon. Wm. C. Whitney, ry of the Navy, December, 1888. (*See* Executive ent No. 46, House of Representatives, 50th Con- d session.) An observatory is inefficient and the age that has not the facility of charting the means of photography.			
NEW BUILDINGS.			
arters for observers, four (4) buildings, at $7,500 (Submitted.)	.....	30,000	.....
:.—No service requires such unremitting attention nstant presence at all hours as astronomy; and no atory can be regarded as economically managed does not furnish dwellings for all its observers eir instruments. It is estimatad that, with the ers living on the grounds of the observatory, not ill two or three times as much work be done as otherwise be possible, but the quality of this deli- ork will be materially improved on account of the ers being in proper physical condition to begin abors, instead of with nerves unstrung by traveling iles from their homes immediately after meals, or easonable hours of the night.			
Total	.....	92,000	23,956

ORT OF THE SUPERINTENDENT OF THE NAUTICAL ALMANAC.

NAUTICAL ALMANAC OFFICE, NAVAL OBSERVATORY,
Georgetown Heights, D. C., September 27, 1894.

R: I have the honor to submit the following report of the work of office for the past year:

PRINTING.

e American Nautical Almanac for 1897 was issued in November, . The American Ephemeris for 1897 was issued in June, 1894. American Nautical Almanac for 1898 was issued in September, 1894, the Pacific Coaster's Almanac for 1895 in August, 1894. Of the emeris and Nautical Almanac for 1898, 318 pages are now in type.

DISTRIBUTION.

iring the fiscal year ending June 30, 1894, the sale and distribution iblications have been as follows:

Publications.	Sold.	Distributed.	Issued to public service.	Total.
an Ephemeris	584	711	464	1,759
an Nautical Almanac	2,029	.....	315	2,344
Coaster's Almanac	1,287	.....	26	1,313
omical papers	23	525	11	559

The proceeds of sales, amounting to $1,245.84 have, in compliance with law, been deposited in the Treasury to the account of the appropriation for public printing and binding.

NEW TABLES OF THE PLANETS.

I have to report the substantial completion of the work of determining the fundamental constants of astronomy and the elements and masses of the major planets from Mercury to Saturn, inclusive. All that remains to be done upon the fundamental data is the final completion of the discussion, adjustment, and combination of all the separate results into a homogeneous whole. The work of putting the results into the form of tables for future use has been commenced, and will make rapid progress as soon as the final numbers are decided upon. I hope to have the tables from Mercury to Mars, inclusive, completed by the end of the fiscal year. There is, however, some doubt in the case of Mars, because the mathematical theory of the motion of this planet is particularly difficult, and must be reconstructed before satisfactory tables can be made. The tables of Jupiter and Saturn were completed by Mr. G. W. Hill during the last fiscal year, he having been employed for that purpose. This will leave only the planets Uranus and Neptune to be worked up, and they will be so treated as not to involve special difficulty.

The present seems an appropriate time to present a general report upon the nature and objects of this work. Its necessity was suggested by the fact that no existing tables of any of the planets, Leverrier's tables of Mercury and the Earth excepted, were sufficiently exact to satisfy the needs of the astronomy of the present time; and even these two will probably fail for the astronomy of the immediate future. But this is by no means the most serious defect of the existing tables. Even in the best, those of Leverrier, there is so great a lack of homogeneity in the elements employed, and such a combination of empirical and theoretical results, that it is impossible to decide, without long investigations in each particular case, whether observed deviations from the tables are due merely to defective determinations of the fundamental data, or to unknown causes acting on the motions of the planets.

The improved determinations of astronomical constants, which have been made from time to time during the last half century, have not served to diminish the confusion, because they have added to the number of diverse and inconsistent quantities with which the astronomer has to deal. New values to be accepted everywhere as authoritative should be founded on a complete rediscussion of all existing data. This is true, not only of the fundamental constants but also of the elements of the planetary orbits.

Since the reduction of the older observations were nearly all made with defective data, or on a system which is now known to be not the best, a necessary part of the work was the complete rediscussion, and in most cases a partial or complete rereduction of all the good observations of the sun and planets made since 1750. The actual number of separate meridian observations of the sun and each of the three planets in question, which have been thus rereduced or corrected and compared with Leverrier's tables, are as follows. I add the corresponding number of observations made use of by Leverrier:

Object.	Number of observations in new theory.	Number of observations used by Le Verrier.
sun	40,176	8,911
ury	5,421	412
ıa	12,319	551
s	4,114	1,019
Total	62,030	10 893

In this list an observation both of right ascension and declination at single transit is counted as a single observation. Were these two ements counted separately, the total number of observations would more than 100,000.

To treat these observations, it was necessary to begin *ab initio* and determine the positions of the principal fixed stars used for clock orrection. New declinations were also necessary, but they were found n Prof. Boss's exhaustive work on the subject, completed when the present work was beginning. A complete reconstruction from first principles of the mathematical formulæ for the motions of the planets was also necessary, because Le Verrier's investigations made on this subject were made by methods now recognized as not the simplest and best, and it was therefore essential to test his results. So far as the interior planets are concerned, the result has been in substantial accord with that of Le Verrier's researches, the planet Mars excepted. This agreement by two methods resting on entirely different foundations seems to afford satisfactory evidence of the correctness of both. In the case of Jupiter and Saturn, however, the method adopted by Le Verrier signally fails, and Mr. Hill's work must therefore entirely supersede it.

The scale on which it was necessary to do the work is not adequately indicated by the amount of material used. Ordinarily the determination of the elements of a planet only involves the solution of equations involving 6 or 7 unknown quantities. But in the present theory it was necessary to the satisfactory character of the results that the equations in the case of the 3 planets observed each should involve 22 or 23 unknown quantities. The total number of equations was as follows:

From observations of the—	
Sun	11,676
Mercury	3,929
Venus	4,849
Mars	1,597
Total	22,051

In the case of the sun the number of unknown quantities could be reduced to 3 or 4 for each equation; but in the case of the 10,375 observations of the planets it was necessary to include the whole 23 unknown quantities.

The equations had all to be solved by the method of least squares, by which alone could separate values of the required quantities be found.

The means available for the prosecution of this work have borne no proportion to its magnitude. The latter would have suggested the employment of a body of the most experienced and eminent mathematicians and astronomers, at salaries proportioned to their professional abilities. As a matter of fact, however, the only increase of appropriations asked for on account of this work was from $3,000 to $4,000

annually. All the labor that could not be employed with this amou had to be gained by lowering the price paid for outside work and organizing the regular work of the Ephemeris that less labor would required in its construction.

Distinguished cooperation has, however, been secured, and utiliz in various ways. Worthy of especial mention in this connection is t work of Mr. George W. Hill, formerly an assistant in this office, w resigned in 1892, after having brought the theory and tables of Ju ter and Saturn so nearly to completion that their actual completi would involve no serious difficulty. His official and private works this and allied subjects, especially on the motion of the moon, ha gained for him at home and abroad the recognition due to one of tl first mathematical astronomers of the time. On his visit to Engla in 1892 the University of Cambridge conferred upon him the honora degree of Doctor of Laws, and academies of science at various tim have elected him to corresponding membership.

In several instances foreign astronomers have made observatio and investigations which, to a greater or less extent, were intended afford available data for the work, though made in the course of reg lar public duty. First among the distinguished astronomers thus co tributing must be mentioned Dr. David Gill, Her Majesty's astronom at the Cape of Good Hope. The southern latitude of the Cape observ tory and its fine climate would give great value to meridian observ tions made there. From 1884 to 1890, inclusive, Dr. Gill made a sp cialty of such observations and communicated the results in advan of publication. During these years the number of his observations Mercury was about as great as those made at all the other observa ries of the world. Of the greatest value, also, has been the incepti by him of a method of determining through actual measurement t parallax of the sun by heliometer comparisons of minor planets wi neighboring stars. On his motion three campaigns for such observ tions were undertaken by several observatories of Europe and that Yale College in the United States. The results of two of these we worked up by Dr. Gill and of the third by Dr. W. L Elkin, astronom of the Yale observatory. All were communicated in advance of pu lication. They proved to be the most accurate measures on the sol parallax yet made.

The Astronomer Royal of England has also communicated observ tions in advance of publication, the last of which proved to be of t greatest importance. They were the meridian observations of Ma in 1892, and their study made evident the defect already alluded to the theory of the motion of that planet, which might otherwise ha escaped detection until much useless work had been done in discussi the observations.

The courtesy of the directors of the observatories of Paris and Strasburg, as well as of the computing bureau of the Berlin observ tory, should also be acknowledged in this connection. In the case Strasburg the reduction of a valuable series of observations of the s and interior planets was accelerated, in order that they might be co municated in time to be utilized. Valuable results of the older Gree wich observations were also received from Dr. Auwers, of Berlin. hardly needs to be added that the unpublished observations of tl Naval Observatory were always placed at my disposal by the supe intendent.

The following works, mentioned in my last annual report as in progres have been completed, and for the most part put in shape for publication.

The discussion of meridan observations of the moon, made at Greenwich and Washington about 1862, to determine the solar parallax from the observed value of the moon's parallactic inequality.

(2) The discussion of all the contact observations made on the transits of Venus in 1874 and 1882. The separate result of each contact has been completely worked out. I should add that the funds for routine computation on this work were supplied, through Prof. Pickering, by Miss Caroline Bruce, of New York.

(3) The determination of the mass of Jupiter from observations of Polyhymnia, made from the discovery of the latter in 1854 until 1888, and from the best other sources.

(4) The computation of the secular variations of the orbits of the four inner planets.

Several of these and other researches are expected to be published in subsequent volumes of the Astronomical Papers prepared for the American Ephemeris.

Of Vol. V, of this series, Parts I and II have been published during the past year. Part I contains a development of the perturbative function of planetary motion, which was used especially in computing the secular variations. Part II contains a computation of certain inequalities of long period in the four inner planets dependent on the second power of the masses.

Parts II and IV are now in press. Part III consists of a mathematical investigation of the action of the moon on the planets, which was commenced more than twenty years ago, and which was closely connected with the researches on the motion of the moon, which I made at the Naval Observatory at that time. Part IV comprises a computation of the secular changes in the orbits of the four inner planet.

There are several other points in which the tables of the Ephemeris are in great need of improvement. The most pressing of these is the case of the fixed stars. In recent times there has arisen a greatly increased demand for accurate positions of a much larger number of fixed stars than have heretofore been given in the Ephemeris, owing to the wants of geographical surveyors, as well as of astronomers. The absorption of the office in the work of perfecting the tables of the planets has resulted in the postponement of a much needed improvement of the Ephemeris in this respect. A small appropriation is therefore asked for to enable this want to be supplied.

New tables of the moon are also needed by all ephemerides of the world. Those of Hansen, as corrected in this office, are now in universal use. They were published as far back as 1857, and are now found to be defective in several important points.

In conclusion, I would ask the attention of the Bureau to the merits and abilities of Assistant Cleveland Keith, as a manager of computations. His services during the past six years in overseeing the reduction of the immense mass of observations above described, and the voluminous computations relating to the planetary theories, have been of the greatest value in enabling the work to be brought to a completion at the present time.

Very respectfully, your obedient servant,

S. NEWCOMB,
Superintendent Nautical Almanac.

The CHIEF OF THE BUREAU OF EQUIPMENT,
Navy Department.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Nautical Almanac Office.

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.			
Salaries of assistants in preparing for publication the American Ephemeris and Nautical Almanac, viz:			
Three assistants, at $1,600 each	$4,800		
Two assistants, at $1,400 each	2,800		
Three assistants, at $1,200 each	3,600		
Two assistants at $1,000 each	2,000		
One copyist and typewriter, at $900	900		
One assistant messenger, at $720	720		
One laborer, at $660	660		
		$15,480	$15,480
Pay of computers on piecework in preparing for publication the American Ephemeris and Nautical Almanac, and in improving the tables of the planets	5,000	5,000	8,400
Computations on new tables of the moon and of the stars (submitted)	2,000		
NOTE.—An improved ephemeris of the fixed stars is urgently requested by the Coast and Geodetic Survey and other Government offices determining geographical positions, and by astronomers generally. The existing tables of the moon's motion are those of Hansen, published by the British Government in 1857. New tables corresponding to those of the planets soon to be issued are now wanted for use in all the ephemerides of the world.			

REPORT OF NAVAL INSPECTOR OF ELECTRIC LIGHTING.

NAVY DEPARTMENT, BUREAU OF EQUIPMENT,
Washington, D. C., September 18, 1894.

SIR: I have the honor to submit the following report of work done under the supervision of this office during the past year:

The electric plants of the following new vessels have been completed, viz: *Machias*, *Castine*, *Columbia*, *Marblehead*, *Montgomery*, *Raleigh*, and *Cincinnati*. Those of the *Olympia*, *Amphitrite*, *Minneapolis*, and *Ericsson* are practically finished. New plants have been installed in the *Atlanta* and *Boston*. The work of installation is well advanced on board the *Maine*, *Texas*, *Indiana*, *Massachusetts*, *Oregon*, *Monadnock*, and *Katahdin*, and the plants of these vessels will be ready for use by the time the vessels are otherwise completed.

Specifications and light lists have been prepared for gunboats Nos. 7, 8, and 9.

Such repairs as were found necessary in order to keep the plants of vessels in commission in good running order have been made.

The change made in the code has necessitated changes in the keyboards and hoists of lanterns of the electric night-signaling apparatus. The signal sets already supplied to vessels are being altered to meet the requirements of the new code, and a keyboard of a new and somewhat improved pattern has been designed, which will be supplied with all new signal sets. Double truck lights, for use as speed and squadron lights, are being fitted as rapidly as possible on the fore and main masts of all vessels having electric plants. The lamps are wired to the bridge, where, by means of suitable switches and keys, any one of the four lamps can be turned on, flashed, or extinguished, as desired.

In addition to the current work of the office, a plan for the compartmental ventilation of ships by means of electrically operated fans located in the several compartments, each furnished with independent air pipes, whereby the compartments are separately ventilated, has been prepared and submitted, and the standard specifications for electrical material and for the installation of the same on board naval vessels have been revised and published.

Electrical material.—Much has been done in the way of improving the design and construction of the material used in naval electric plants, in directions suggested by practical experience.

Generating sets.—The following changes have been designed and introduced, viz, a new engine, more compact, better balanced, and having the parts more accessible for examination and adjustment; a modification in the shape of the field frame of the dynamo, which permits the use of a better form of field coil and of metal spools for the field coils; separate shafts for the engine and dynamo, joined by a solid coupling, and a field frame in two parts, thus greatly facilitating the operation of taking apart both engine and dynamo for repairs.

Wiring accessories.—The interior fittings of junction boxes, switches, etc., have been strengthened and improved where experience had shown such changes were desirable.

Fixtures.—Several of the standard fixtures have been improved in various details.

Search lights.—As stated in last year's report, search-light projectors have been made the subject of much investigation and experiment with the view of equipping vessels now building with the best lights obtainable. The following general conclusions were reached, and projectors embodying the various points are being manufactured:

The barrel and pedestal to be made lighter and to be improved in shape. The arms to be made as separate parts and to be bolted to the base.

The barrel to be made to take either the Mangin or the parabolic mirror and the mirror to be secured in place in the projector separately from the metal back.

The lamp to be of the horizontal carbon type and fitted for both automatic and hand adjustment.

Electrically controlled projectors to be also capable of being worked by hand. The controller to be small, light, and water-tight.

In order to test practically under service conditions the comparative merits of the Mangin and parabolic forms of mirror, it is proposed on board certain vessels to fit a part of the projectors with Mangin and a part with parabolic mirrors. As the projectors will be designed to take either type, an exchange of mirrors can be readily effected if found desirable.

In concluding this report it is desired to renew the recommendation of last year, that a rating of electrical or dynamo machinist be established.

Respectfully submitted.

W. MAYNARD,
Commander, U. S. Navy.

The CHIEF OF THE BUREAU OF EQUIPMENT,
Navy Department.

REPORT OF SUPERINTENDENT OF COMPASSES.

NAVY DEPARTMENT, BUREAU OF EQUIPMENT,
Washington, D. C., September 27, 1894.

SIR: I have the honor to submit the following report of the operations of this office for the past year:

The usual routine work has been carried on and Compass Reports, reports of magnetic surveys and dock observations relative to the compass have been received from vessels in commission. These have been examined, discussed, and placed on file.

I desire to call to your attention the favorable showing of compass work from the navigators afloat, and the general excellent condition of compasses at sea, due to the efficient care and attention of the commanding officers.

A number of officers (15) have been instructed in practical compensation of the compass in the office during the year. The value of a short course of instruction can not be overestimated. An arrangement of the model "Scoresby" closely resembling conditions afloat enables the officer to practically go through with all compass problems and to acquire in a short time a familiarity with the subject, its conditions and possibilities that would be otherwise almost impracticable.

Experiments have been continued in the office and recorded. Various compass devices have been submitted and carefully examined.

The modified binnacle in one casting has been issued for service and is very satisfactory.

The new edition of the Admiralty Manual (1893) has been received and issued in ships library.

The issue of Practical Problems and the Compensation of the Compass in the U. S. Navy, by Lieut. S. W. B. Diehl, U. S. Navy, has been continued.

Compasses have been located on board the *Atlanta*, *Raleigh*, *Marblehead*, *Columbia*, *Montgomery*, *Cincinnati*, and temporarily on board the *Maine*.

Approximate compensation has been made by the office on board the *Raleigh*, *Marblehead*, *Columbia*, *Montgomery*, *Cincinnati*, and *Maine*.

Approximate locations for compasses have been suggested on board the vessels now under construction from the plans submitted.

The number of U. S. Navy service compasses has been increased by 20 during the past year, 20 of obsolete pattern having been repaired into that type. Fifteen other service compasses, 27 boat service compasses, 1 6-inch compass, and 3 azimuth circles have also been repaired, all by E. S. Ritchie & Sons.

Two service compasses and one azimuth circle have been purchased from the salvage of the wreck of the *Kearsarge*; these, after repairs, will be serviceable.

Fifty 2½-inch liquid compasses fitted with a device for lifting the card off the pivot have been purchased for use in boats and a number issued to the *Cincinnati* and *Raleigh*. These compasses, made by E. S. Ritchie & Sons with exceeding care and guaranteed for three years, are mounted in solid blocks of pine; they are intended to be kept in the boat to which assigned, safely and securely fastened where most convenient for use and least liable to accidental injury. They are more economical, more compact, more easily read, and will undoubtedly be more durable than the old boat service compass and binnacle.

One binnacle, type III modified, has been purchased, made of aluminum. This has been tested in the office and will be issued to the *Ericsson*. The weight is 57 pounds compared with 145 pounds when made of brass; the cost will be the same. Experiments are being made with aluminum for the material of azimuth circles and compass bowls, the alloy tested having no magnetic effect upon the compass.

Quadrantal correcting spheres and Flinders rods have been furnished when required by the Bureau of Steam Engineering at the navy-yards at New York and Norfolk.

During the year Lieut. W. W. Buchanan, U. S. Navy, has ably assisted in the performance of the duties of the office. It is a matter of regret that, owing to the small force in the office, the revision of Compass Variations and the publication thereof was necessarily turned over to the Hydrographic Office. For the same reason it was found impossible to prepare any of the valuable information at hand for publication.

I would again call attention to the scant office accommodations and recommend that an additional room be assigned nearer the Bureau proper.

Very respectfully,

C. P. PERKINS,
Lieutenant, U. S. Navy, Superintendent of Compasses.

The CHIEF OF BUREAU OF EQUIPMENT.

REPORT

OF

THE CHIEF OF THE BUREAU OF NAVIGATION.

BUREAU OF NAVIGATION,
NAVY DEPARTMENT,
Washington, D. C., October 23, 1894.

SIR: I have the honor to submit herewith a report (marked A) of the movements and duties of the ships of the Navy during the past year, a copy (marked B) of the report of the superintendent of the Naval Academy, a copy (marked C) of the report of the commandant of the Training Station, a copy (marked D) of the report of the president of the War College and Torpedo School, and a copy (marked E) of the report of the hydrographer to the Bureau of Navigation.

Estimates for the support of the Bureau, the Naval Academy, the Training Station, the Naval War College and Torpedo School, and the Hydrographic Office are also submitted (marked F).

During the year the *Columbia*, *Cincinnati*, *Raleigh*, *Atlanta*, *Marblehead*, *Montgomery*, *Essex*, *Machias*, *Castine*, and *Alert* have been commissioned for service. The *Lancaster*, *Alliance*, *Machias*, *Marion*, and *Boston* have been put out of commission. The *Kearsarge* was wrecked February 2, 1894.

In accordance with the provisions of the postal subsidy act, approved March 3, 1891, and at the request of the Postmaster-General, three American steamships have been inspected, tested for speed, and classified since October 13, 1893.

During the fiscal year ending June 30, 1894, 3,964 men and 561 apprentices were enlisted or reenlisted in the Navy—815 men on board of cruising ships, 2,909 men and 561 apprentices on board of receiving ships and at ports where there are naval stations, 149 men for the Coast and Geodetic Survey, and 91 men for the vessels of the Fish Commission; 2,151 men and 1,301 boys, candidates for enlistment on board of the receiving ships, were rejected for physical disqualifications, and 7,156 men and 185 boys were rejected for other causes; 2,819 men and 341 apprentices were discharged—2,194 by reason of expiration of enlistment, 162 for disability, 153 by reason of services being no longer required, 264 at their own request, 48 by purchase, 50 men by request of their commanding officers, 118 for bad conduct, 20 on account of illegal enlistment, and 151 for inaptitude. Seven hundred men and 220 apprentices deserted during the year. Of this number 549 men

and 194 apprentices deserted in home ports. Forty-eight men and 21 boys died. The number of enlisted men serving under continuous service certificates June 30, 1894, was 1,824.

Five thousand six hundred and fifty-nine dollars and one cent have been paid to enlisted men in prizes for target practice with great guns, machine guns, and small arms during the fiscal year ending June 30, 1894.

Under sections 4756 and 4757 of the Revised Statutes, 36 pensions have been allowed and 16 disallowed.

Very respectfully,

F. M. RAMSAY,
Chief of Bureau.

The SECRETARY OF THE NAVY.

A.

THE COMPOSITION OF THE SQUADRONS ON EACH STATION AND THE DUTIES PERFORMED BY EACH VESSEL.

NORTH ATLANTIC STATION.

Commanders-in-chief: Rear-Admiral A. E. K. BENHAM until December 21, 1893; Rear-Admiral O. F. STANTON from January 12, 1894, to August 1, 1894; and Rear-Admiral R. W. MEADE since August 4, 1894.

Ships: *New York* (flagship), *Columbia*, *San Francisco*, *Miantonomoh*, *Atlanta*, *Marblehead*, *Kearsarge* (wrecked February 2, 1894), and *Vesuvius*.

ASIATIC STATION.

Commanders-in-chief: Rear-Admiral JOHN IRWIN until October 27, 1894; Rear-Admiral JOSEPH S. SKERRETT from December 9, 1893, to July 11, 1894; and Rear-Admiral C. C. CARPENTER since August 28, 1894.

Ships: *Baltimore* (flagship), *Charleston*, *Lancaster*, *Detroit*, *Concord*, *Yorktown*, *Marion*, *Monocacy*, *Machias*, and *Petrel*.

PACIFIC STATION.

Commanders-in-chief: Rear-Admiral JOSEPH S. SKERRETT until November 7, 1893; Rear-Admiral JOHN IRWIN from that date until April 14, 1893; Rear-Admiral JOHN G. WALKER from that date until August 24, 1894; and Rear-Admiral L. A. BEARDSLEE since.

Ships: *Philadelphia* (flagship), *Monterey*, *Charleston*, *Boston*, *Yorktown*, *Bennington*, *Mohican*, *Adams*, *Alliance*, *Alert*, and *Ranger*.

SOUTH ATLANTIC STATION.

Commanders-in-chief: Rear-Admiral O. F. STANTON until October 27, 1893; Rear-Admiral A. E. K. BENHAM from January 12, 1894, to April 10, 1894; and Rear-Admiral W. A. KIRKLAND from April 30, 1894, to August 15, 1894.

Ships: *New York*, *Newark*, *San Francisco*, *Charleston*, *Detroit*, *Alliance*, and *Yantic*.

EUROPEAN STATION.

Commanders-in-chief: Rear-Admiral HENRY ERBEN until September 6, 1894; and Rear-Admiral W. A. KIRKLAND since September 12, 1894.

Ships: *Chicago* (flagship) and *Bennington*.

BERING SEA SQUADRON.

Formed of vessels of Pacific and Asiatic stations, the Revenue Service, and Fish Commission. Commander C. E. CLARK in command from April 13, 1894.

Ships: *Mohican*, *Concord*, *Yorktown*, *Adams*, *Alert*, *Ranger*, *Petrel*, *Rush*, *Corwin*, *Bear*, and *Albatross*.

SHIPS ON SPECIAL SERVICE.

Dolphin, *Essex*, *Thetis*, *Fern*, *Bancroft*, *Michigan*, *Pinta*, *Monongahela* *Portsmouth*, and torpedo boat *Cushing*.

SHIPS UNASSIGNED TO STATIONS.

Cincinnati, *Raleigh*, *Montgomery*, and *Castine*.

FIRST RATE.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
New York, Capt. J. W. PHILIP, commanding. Relieved by Capt. R. D. EVANS, August 23, 1894.				
			Knots.	
New York, N. Y	Oct. 5, 1893	Dec. 11, 1893	350	Assigned to South Atlantic Station and ordered to proceed to Rio Janeiro.
Do	Dec. 15, 1893	Dec. 26, 1893	1,570	
Santa Lucia, West Indies	Jan. 1, 1894	Jan. 4, 1894	3,309	
Rio de Janeiro, Brazil	Jan. 16, 1894	Mar. 23, 1894	800	
Bahia, Brazil	Mar. 27, 1894	Mar. 28, 1894	676	
Santa Lucia, West Indies	Apr. 8, 1894	Apr. 13, 1894	45	Cruising to protect American interests.
St. Pierre, Martinique	Apr. 13, 1894	....do	588	
San Domingo, Haiti	Apr. 16, 1894	Apr. 19, 1894	455	
Kingston, Jamaica	Apr. 21, 1894	May 8, 1894	637	Ordered to Cayman Brac to secure relics of Kearsarge.
Colon, United States of Colombia	May 11, 1894	May 11, 1894	286	
Bluefields, Nicaragua	May 13, 1894	June 9, 1894	650	
Kingston, Jamaica	June 12, 1894	June 18, 1894	1,500	Assigned to North Atlantic Station June 29.
New York	June 24, 1894	July 5, 1894	.....	
Gloucester, Mass	July 7, 1894	July 14, 1894	463.1	Duty in connection with trial of Minneapolis.
Boston, Mass	July 14, 1894	July 15, 1894	20	
Tompkinsville, Staten Island	July 17, 1894	July 21, 1894	389.4	
Gardiners Bay	July 21, 1894	July 28, 1894	135	
Tompkinsville, Staten Island	July 29, 1894	Aug. 5, 1894	135	Flagship of station from Aug. 4. Cruise for instruction of Pennsylvania naval militia.
Philadelphia and outside	Aug. 7, 1894	Aug. 14, 1894	250	
Navy-yard, New York	Aug. 16, 1894	.....	256	
Total distance sailed	.....	.....	12,514.5	
Columbia, Capt. G. W. SUMNER, commanding.				
Navy-yard, League Island, Pa	.....	.....	.....	Commissioned Apr. 23, 1894.
New York, N. Y	July 18, 1894	July 16, 1894	220	Assigned to North Atlantic Station June 29.
Off Bluefields, Nicaragua, Central America.	July 29, 1894	July 21, 1894	2,015	
Port Limon, Costa Rica, Central America.	Aug. 23, 1894	Aug. 23, 1894	123	Cruising to protect American interests.
Off Bluefields	Sept. 4, 1894	Sept. 3, 1894	123	
Little Corn Island, Nicaragua	Sept. 5, 1894	Sept. 5, 1894	44	
Off Bluefields	Sept. 12, 1894	Sept. 12, 1894	44	
Port Limon	Sept. 23, 1894	Sept. 22, 1894	123	
Off Bluefields	Sept. 25, 1894	Sept. 24, 1894	123	
Little Corn Island	....do	Sept. 25, 1894	44	
Total distance sailed	.....	.....	2,859	

SECOND RATE.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Baltimore, Capt. W. R. BRIDGMAN, commanding. Relieved by Capt. B. F. DAY, July 12, 1894.	.....	.....	.....	Asiatic Station.
Algiers, Algeria	Oct. 1, 1893	Oct. 1, 1893	1,357	
Alexandria, Egypt	Oct. 17, 1893	Nov. 3, 1893	153	
Port Said, Egypt	Nov. 3, 1893	Nov. 7, 1893	3,525	
Colombo, Ceylon	Nov. 25, 1893	Dec. 2, 1893	1,560	
Singapore, Straits Settlements	Dec. 10, 1893	Dec. 14, 1893	1,540	
Victoria, Hongkong	Dec. 22, 1893	Jan. 2, 1894	.....	
Yokohama, Japan	Jan. 10, 1894	Feb. 19, 1894	1,650	Flagship of squadron from January 16.
Yokosuka, Japan	Feb. 19, 1894	Feb. 27, 1894	15	
Yokohama, Japan	Feb. 27, 1894	Mar. 26, 1894	15	
Owari Bay	Mar. 28, 1894	Apr. 1, 1894	173	
Yokohama, Japan	Apr. 2, 1894	Apr. 7, 1894	1,140	
Woosung, China	Apr. 13, 1894	May 4, 1894	116	
Woosung, China	May 9, 1894	May 12, 1894	485	
Nagasaki, Japan	May 14, 1894	June 3, 1894	502	To protect American interests.
Chemulpo, Korea	June 5, 1894	.....	.....	
Total distance sailed	.....	.....	12,231	Cruising report for quarter ending Sept. 30 not received.
Chicago, Capt. A. T. MAHAN, commanding.	.....	.....	.....	Flagship European Station.
Queenstown, Ireland	June 30, 1893	July 14, 1893	3,129	
Kingstown, Ireland	July 15, 1893	July 23, 1893	168	
Cherbourg, France	July 25, 1893	July 30, 1893	381	
Cowes, Isle of Wight	July 30, 1893	Aug. 3, 1893	76	
Southampton, England	Aug. 3, 1893	Sept. 5, 1893	(*)	*Not logged.
Havre, France	Sept. 5, 1893	Sept. 15, 1893	77	
Lisbon, Portugal	Sept. 19, 1893	Oct. 2, 1893	908	
Gibraltar	Oct. 3, 1893	Oct. 9, 1893	316	
Tangier, Morocco	Oct. 9, 1893	Oct. 11, 1893	32	
Gibraltar	Oct. 11, 1893	Oct. 12, 1893	30	
Malaga, Spain	Oct. 12, 1893	Oct. 23, 1893	60	
Barcelona, Spain	Oct. 25, 1893	Nov. 3, 1893	436	
Marseilles, France	Nov. 4, 1893	Nov. 15, 1893	170	
Genoa, Italy	Nov. 16, 1893	Dec. 1, 1894	179	
Villefranche, France	Dec. 2, 1894	Feb. 6, 1894	87	
Genoa, Italy	Feb. 7, 1894	Feb. 9, 1894	90	
Naples, Italy	Feb. 11, 1894	Feb. 25, 1894	366	
La Grana Bay, Greece	Feb. 28, 1894	Mar. 1, 1894	656	
Smyrna, Turkey	Mar. 2, 1894	Mar. 11, 1894	192	
Mersyn, Turkey	Mar. 14, 1894	Mar. 15, 1894	597	
Alexandretta, Syria	Mar. 16, 1894	Mar. 17, 1894	80	
Beirut, Syria	Mar. 18, 1894	Mar. 22, 1894	180	
Alexandria, Egypt	Mar. 24, 1894	Apr. 1, 1894	334	
Valletta, Malta	Apr. 4, 1894	Apr. 8, 1894	823	
Algiers, Algeria	Apr. 11, 1894	Apr. 16, 1894	599	
Gibraltar, Spain	Apr. 18, 1894	Apr. 20, 1894	416	
Lisbon, Portugal	Apr. 22, 1894	May 4, 1894	305	
Gravesend, England	May 10, 1894	June 14, 1894	1,017	
Antwerp, Belgium	June 15, 1894	.....	175	International exposition.
Total distance sailed	.....	.....	11,879	Cruising report for quarter ending Sept. 30 not received.
Philadelphia, Capt. A. S. BARKER, commanding. Relieved by Capt. C. S. COTTON, Aug. 24, 1894.	.....	.....	.....	Flagship Pacific Station.
Latitude, 8°43′ N.; longitude, 41°10′ W.				
Rio de Janeiro, Brazil	July 9, 1893	July 17, 1893	2,225	
Callao, Peru	Aug. 7, 1893	Aug. 26, 1893	4,971	En route to Honolulu.
Honolulu, Hawaiian Islands	Sept. 13, 1893	Aug. 12, 1894	5,200	Ordered to proceed to Mare Island navy-yard.
San Francisco, Cal	Aug. 22, 1894	Aug. 23, 1894	2,091	
Mare Island, Cal	Aug 23, 1894	.....	25	
Total distance sailed	.....	.....	14,512	

SECOND RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Monterey, Capt. LOUIS KEMPFF, commanding.	.....	.....	.....	Pacific Station.
Mare Island, Cal	.....	Apr. 9, 1894	.....	
Sausalito, Cal	Apr. 9, 1894	Apr. 10, 1894	25	
San Diego, Cal	Apr. 13, 1894	Apr. 23, 1894	445	Visiting southern California ports.
Santa Barbara, Cal	Apr. 24, 1894	Apr. 29, 1894	175	
Redondo, Cal	Apr. 29, 1894	May 7, 1894	75	
San Pedro, Cal	May 7, 1894	.....do.....	11	
San Francisco, Cal	May 10, 1894	May 11, 1894	360	
Mare Island, Cal	May 11, 1894	.....do.....	30	
San Francisco, Cal	.....do.....	May 12, 1894	30	
Mare Island, Cal	May 12, 1894	Aug. 13, 1894	30	
Astoria, Oreg	Aug. 17, 1884	Aug. 25, 1894	542.3	
Port Townsend, Wash	Aug. 26, 1894	Sept. 10, 1894	214	
Seattle, Wash	Sept. 10, 1894	Sept. 13, 1894	35	
Tacoma, Wash	Sept. 13, 1894	Sept. 30, 1894	30	
New Whatcom, Wash	Sept. 30, 1894	.....	97	
Total distance sailed	.....	.....	2,099.3	
Newark, Capt. SILAS W. TERRY, commanding.	.....	.....	.....	Flagship South Atlantic Station.
Latitude, 17° 02′ N.; longitude, 63° 01′ W.	Sept. 30, 1893	Sept. 30, 1893	.....	
Bridgetown, Barbados	Oct. 2, 1893	Oct. 6, 1893	274	
Rio de Janeiro, Brazil	Oct. 20, 1893	.....	3,081	Protecting American interests.
Do	....do.....	Feb. 14, 1894	1,037	
Montevideo, Uruguay	Apr. 1, 1894	May 5, 1894	109	
Outer Roads, Buenos Ayres, Argentine Republic.	May 5, 1894	May 6, 1894	18	
Ensenada Docks, Argentine Republic.	May 6, 1894	June 9, 1894	35	
Outer Roads, Buenos Ayres, Argentine Republic.	June 9, 1894	June 20, 1894	109	
Montevideo, Uruguay	June 20, 1894	.....	.....	
Total distance sailed	.....	.....	4,663	Cruising report for quarter ending Sept. 30 not received.
San Francisco, Capt. J. C. WATSON, commanding. Relieved by Capt. P. H. COOPER, July 20, 1894.	.....	.....	.....	Flagship North Atlantic Station.
New York	.....	Oct. 18, 1893	1,131	
Key West	Oct. 25, 1893	Oct. 29, 1893	500	
Grand Cayman	Oct. 31, 1893	Nov. 2, 1893	370	
Old Providence	Nov. 4, 1893	Nov. 6, 1893	54	
St. Andrews	Nov. 6, 1893	Nov. 7, 1893	74	
Great Corn Island	Nov. 7, 1893	Nov. 10, 1893	34	
Bluefields	Nov. 10, 1893	Nov. 14, 1893	61	To protect American interests.
Greytown	Nov. 14, 1893	Nov. 15, 1893	70	
Port Limon	Nov. 16, 1893	Nov. 18, 1893	163	
Aspinwall	Nov. 19, 1893	Nov. 22, 1893	264	
Cartagena	Nov. 24, 1893	Nov. 28, 1893	75	
Porto Colombia	Nov. 28, 1893	Dec. 1, 1893	63	
Santa Marta	Dec. 1, 1893	Dec. 4, 1893	392	
Curaçoa	Dec. 6, 1893	Dec. 13, 1893	105	
Puerto Cabello	Dec. 14, 1893	Dec. 17, 1893	403	
Port au Spain	Dec. 18, 1893	Dec. 21, 1893	2,221	Ordered to proceed to Rio Janeiro and protect American interests.
Pernambuco	Dec. 31, 1893	Jan. 3, 1894	420	
Bahia	Jan. 5 1894	Jan. 9, 1894	800	
Rio de Janeiro	Jan. 12, 1894	Feb. 25, 1894	10	Flagship South Atlantic squadron from Dec. 31, 1893, to Mar. 18, 1894.
Off Itaipu Point	Feb. 25, 1894	Mar. 4, 1894	10	
Rio de Janeiro	Mar 4, 1894	Mar. 12, 1894	10	
Off Itaipu Point	Mar. 12, 1894	Mar. 13, 1894	10	
Rio de Janeiro	Mar. 13, 1894	Mar. 18, 1894	3,171	
Port Castries, St. Lucia, British West Indies	Apr. 2, 1894	Apr. 3, 1894	511	
Curaçao, Dutch West Indies	Apr. 6, 1894	Apr. 8, 1894	890	
Bluefields, Nicaragua	Apr. 11, 1894	Apr. 17, 1894	120	
Port Limon, Costa Rica	Apr. 18, 1894	Apr. 22, 1894	120	
Bluefields, Nicaragua	Apr. 23, 1894	Apr. 25, 1894	60	
town, Nicaragua	Apr. 25, 1894	....do.....	60	

SECOND RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Bluefields, Nicaragua	Apr. 26, 1894	May 7, 1894	20	
Pearl Cay Lagoon, Nicaragua	May 7, 1894	May 8, 1894	20	
Bluefields, Nicaragua	May 8, 1894	May 11, 1894	60	
Greytown, Nicaragua	May 12, 1894	May 12, 1894	60	
Bluefields, Nicaragua	....do	June 1, 1894	275	
Colon, Colombia	June 3, 1894	June 7, 1894	275	
Bluefields, Nicaragua	June 9, 1894	June 19, 1894	510	
Cayman Brac, British West Indies.	June 22, 1894	June 23, 1894	.....	
Tompkinsville, Staten Island	July 1, 1894	July 3, 1894	.....	
Navy-yard, Brooklyn, N. Y	July 3, 1894	July 21, 1894	6	
Gardiners Bay, Long Island Sound	July 22, 1894	July 25, 1894	194	
Fishers Island	July 25, 1894	July 26, 1894	19	
Block Island Sound	July 26, 1894	....do	6	
Fishers Island	....do	July 28, 1894	6	
Tompkinsville, Staten Island	July 29, 1894	July 29, 1894	144	
Navy-yard, Brooklyn, N. Y	....do	.....	6	Cruise for instruction of New York naval militia.
Total distance sailed	.....	.....	13,773	
Charleston, Capt. H. F. PICKING, commanding. Relieved by Capt. G. W. COFFIN, Feb. 27, 1894.	.....	.....	.....	Pacific Station. Assagned to Asiatic Station Aug. 24.
Navy-yard, Norfolk, Va	May 4, 1893	Aug. 3, 1893	249.5	
Hampton Roads, Va	Aug. 3, 1893	Aug. 12, 1893	15	
Bridgetown, Barbados, West Indies.	Aug. 20, 1893	Aug. 24, 1893	1,776.9	
Montevideo, Uruguay	Sept. 13, 1893	Sept. 22, 1893	4,522	
Rio de Janeiro, Brazil	Sept. 26, 1893	Feb. 18, 1894	1,005	Protecting American interests.
Taipu Bay, Brazil	Feb. 18, 1894	Feb. 27, 1894	9	
Rio de Janeiro, Brazil	Feb. 27, 1894	Feb. 28, 1894	9	
Taipu Bay, Brazil	Feb. 28, 1894	Mar. 11, 1894	9	
Rio de Janeiro, Brazil	Mar. 11, 1894	Mar. 14, 1894	9	
Taipu Bay, Brazil	Mar. 14, 1894	Mar. 17, 1894	5	
Rio de Janeiro, Brazil	Mar. 17, 1894	Mar. 25, 1894	979.2	
Flores Islands, Uruguay	Mar. 30, 1894	Mar. 31, 1894	15	Ordered to proceed to Callao, Peru.
Montevideo, Uruguay	Mar. 31, 1894	May 11, 1894	.....	
Sandy Point, Chile	May 18, 1894	May 22, 1894	1,389	
Callao, Peru	June 4, 1894	June 18, 1894	2,596	
Acapulco, Mexico	June 28, 1894	June 30, 1894	2,065	En route to San Francisco, Cal.
Total distance sailed	.....	.....	14,657.6	Cruising report for quarter ending Sept. 30 not received.
Miantonomoh, Capt. MONTGOMERY SICARD, commanding. Relieved by Commander R. R. WALLACE, Nov. 13, 1893.	.....	.....	.....	North Atlantic Station.
New York	Sept. 20, 1893	Nov. 23, 1893	31	
Gardiners Bay, Long Island	Nov. 23, 1893	Nov. 27, 1893	107	
Huntington Bay, Long Island	Nov. 27, 1893	Nov. 28, 1893	88.9	
New York	Nov. 28, 1893	Dec. 28, 1893	33.9	
Hampton Roads, Va	Dec. 30, 1893	Dec. 31, 1893	291.4	
Norfolk, Va	Dec. 31, 1893	Jan. 31, 1894	12	
York Spit Light	Jan. 31, 1894	Feb. 1, 1894	38	
Yorktown, Va	Feb. 1, 1894	Feb. 16, 1894	15	
Navy-yard, Norfolk, Va	Feb. 16, 1894	Apr. 11, 1894	45	
Yorktown, Va	Apr. 11, 1894	May 4, 1894	52	
Hampton Roads, Va	May 4, 1894	May 5, 1894	40	
Norfolk, Va. (navy-yard)	May 5, 1894	May 9, 1894	12	
Hampton Roads, Va	May 9, 1894	May 27, 1894	12	
Lynn Haven Bay, Va	May 27, 1894	.....	14	
New York	May 29, 1894	June 13, 1894	263.8	Fired salute at tomb of Gen Grant.
Dobbs Ferry, N. Y	June 13, 1894	June 15, 1894	12	To assist in celebration.
Huntington Bay, Long Island	June 15, 1894	June 16, 1894	45	
New London, Conn	June 16, 1894	June 21, 1894	77	
Nantucket Sound	June 21, 1894	June 22, 1894	97	
Portland, Me	June 23, 1894	July 9, 1894	165	Cruising along coast.
Boston, Mass	July 9, 1894	July 19, 1894	101.7	
Provincetown, Mass	July 19, 1894	July 21, 1894	49.9	

SECOND RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Boston, Mass	July 21, 1894	Aug. 11, 1894	49.9	
Provincetown, Mass	Aug. 11, 1894	Aug. 12, 1894	52.1	
Vineyard Haven	Aug. 12, 1894	Aug. 13, 1894	89.8	
Newport, R. I	Aug. 13, 1894	Aug. 22, 1894	38.2	
Gardiners Bay	Aug. 22, 1894	Aug. 27, 1894	49	Cruise for instruction Rhode Island naval mi tia.
New London, Conn	Aug. 27, 1894	Sept. 8, 1894	18.6	
Newport, R. I	Sept. 8, 1894	Sept. 22, 1894	48.4	
Long Island Sound	Sept. 22, 1894	Sept. 23, 1894	104.7	
Navy-yard, New York	Sept. 23, 1894	.....	45.1	
Total distance sailed	.....	.....	2,099.4	
Lancaster, Capt. A. H. McCormick, commanding.	.....	.....	.....	Asiatic Station.
Yokohama, Japan	June 30, 1893	Sept. 24, 1893	.....	
Owari Bay, Japan	Sept. 25, 1893	Sept. 26, 1893	190	
Yokohama, Japan	Sept. 27, 1893	Dec. 19, 1893	190	
Owari Bay, Japan	Dec. 20, 1893	Dec. 20, 1893	195	
Yokohama, Japan	Dec. 21, 1893	.....	195	
Woosung, China	Jan. 31, 1894	Feb. 5, 1894	1,148	
Hongkong	Feb. 10, 1894	Feb. 15, 1894	853	Proceeding to the Unit States.
Singapore, Straits Settlements	Feb. 25, 1894	Feb. 28, 1894	1,464	
Colombo, Ceylon	Mar. 9, 1894	Mar. 14, 1894	1,573	
Aden, Arabia	Mar. 26, 1894	Mar. 28, 1894	2,081	
Suez, Egypt	Apr. 5, 1894	Apr. 5, 1894	565	
Port Said, Egypt	Apr. 6, 1894	Apr. 9, 1894	90	
Naples, Italy	Apr. 16, 1894	Apr. 23, 1894	1,118	
Gibraltar	Apr. 30, 1894	May 2, 1894	997	
Stapleton, Staten Island	June 8, 1894	June 13, 1894	4,490	
Dobbs Ferry, Hudson River	June 13, 1894	June 15, 1894	21	To assist in celebration.
Navy-yard, New York	June 15, 1894	.....	21	Placed out of commiss June 30, 1894.
Total distance sailed	.....	.....	15,191	
Atlanta, Capt. J. R. Bartlett, commanding.	.....	.....	.....	Recommissioned April 1894.
Norfolk, Va	.....	Apr. 25, 1894	.....	North Atlantic Station.
Yorktown, Va	Apr. 25, 1894	May 5, 1894	60	
Lynn Haven Bay	May 5, 1894	....do.....	30	Locating shoal in Y River.
Hampton Roads	....do.....	May 9, 1894	12	
At sea with board of inspection	.....	.....	60	
Hampton Roads	May 9, 1894	May 11, 1894	.....	
Lynn Haven Bay, swinging ship	.....	.....	40	
Hampton Roads	May 11, 1894	May 12, 1894	.....	
Norfolk	May 12, 1894	May 17, 1894	13	
Hampton Roads, after swinging ship in Lynn Haven Bay.	May 17, 1894	May 18, 1894	40	Towing Constellation Newport.
Gardiners Bay	May 20, 1894	May 22, 1894	365	
Newport, R. I	May 22, 1894	May 31, 1894	48	Towing Richmond to Lea Island.
League Island, Pa	June 2, 1894	June 8, 1894	343	
Norfolk, Va	June 10, 1894	June 30, 1894	266	
Boston, Mass	July 3, 1894	July 9, 1894	495.5	
Gloucester, Mass	July 9, 1894	July 14, 1894	27	
Trial course off Isles of Shoals	July 14, 1894	....do.....	33	Duty in connection with t of Minneapolis.
President Roads, Boston Harbor	....do.....	July 24, 1894	53	
Between Gallups and Georges islands, Boston.	July 24, 1894	July 27, 1894	6	
Boston, Mass. (after target practice at sea).	July 27, 1894	July 28, 1894	25	Cruise for instruction Massachusetts naval n tia.
Boston, Mass., (anchorage changed).	July 28, 1894	Aug. 2, 1894	8	
Newport, R. I	Aug. 4, 1894	Aug. 11, 1894	275.3	
Niantic, Conn	Aug. 11, 1894	....do.....	46	
Gardiners Bay	....do.....	Aug. 12, 1894	17	
New Haven, Conn	Aug. 12, 1894	Aug. 13, 1894	51	
Gardiners Bay	Aug. 13, 1894	Aug. 16, 1894	47.5	Cruise for instruction Connecticut naval mili
Niantic, Conn	Aug. 16, 1894	....do.....	17	
Gardiners Bay	....do.....	Aug. 18, 1894	18	

SECOND RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Niantic, Conn	Aug. 18, 1894	Aug. 20, 1894	51	
East River, New York	Aug. 20, 1894	Aug. 23, 1894	52	
Brooklyn navy-yard	Aug. 23, 1894	Sept. 5, 1894	2	Undergoing repairs.
Norfolk navy-yard	Sept. 7, 1894		285.4	
Total distance sailed			2,786.7	
Boston, Capt. B. F. DAY, commanding.				Pacific Station. At Honolulu, Hawaiian Islands last report.
San Francisco	Oct. 7, 1893	Oct. 10, 1893	2,080	Placed out of commission Nov. 4, 1893.
Mare Island	Oct. 10, 1893		28	
Total distance sailed			2,108	
Cincinnati, Capt. HENRY GLASS, commanding.				Commissioned June 16, 1894. Unassigned.
Navy-yard, New York		Aug 24, 1894		Cruising in Long Island Sound to test engines.
Glen Cove, Long Island	Aug. 24, 1894	Aug. 25, 1894	19.5	
Greenport, Long Island	Aug. 27, 1894	Sept. 6, 1894	75.5	
Glen Cove, Long Island	Sept. 7, 1894	Sept. 7, 1894	75.5	
Navy-yard, New York	do			
Total distance sailed			170.5	

THIRD RATE.

Monongahela, Commander T. A. LYONS, commanding. Commander F. W. DICKINS assumed command July 29, 1893. Relieved by Commander C. M. CHESTER, May 15, 1894.				Apprentice training ship.
New York navy-yard	July 17, 1893	July 18, 1893	125	
Newport, R. I	July 20, 1893	July 24, 1893	57	
Portsmouth, N. H. (navy-yard)	July 26, 1893	Aug. 3, 1893	258	
Queenstown, Ireland	Sept. 5, 1893	Sept. 11, 1893	4,036.4	On practice cruise for instruction of naval apprentices.
Cadiz, Spain	Sept. 22, 1893	Oct. 1, 1893	1,128	
Gibraltar	Oct. 2, 1893	Oct. 11, 1893	73	
Tangier, Morocco	Oct. 11, 1893	Oct. 14, 1893	15.2	
Funchal, Madeira	Oct. 21, 1893	Oct. 25, 1893	575.6	
Newport, R. I	Dec. 7, 1893	Dec. 11, 1893	3,978.9	
Hampton Roads, Va	Dec. 13, 1893	Dec. 14, 1893	400.8	Placed out of commission Jan. 31, 1894.
Navy-yard, Norfolk, Va	Dec. 14, 1893		15	
Annapolis, Md	May 3, 1894	June 11, 1894	1,018.5	Recommissioned May 15 and turned over to Naval Academy.
Fort Monroe, Va	July 7, 1894	July 12, 1894	263.7	
Do	Aug. 3, 1894	Aug. 8, 1894	949.4	
Do	Aug. 18, 1894	Aug. 22, 1894	105.8	
Annapolis, Md	Aug. 30, 1894		116.5	
Total distance sailed			13,116.8	
Detroit, Commander W. H. BROWNSON, commanding. Relieved by Commander J. S. NEWELL, Aug. 15, 1894.				South Atlantic Station.
Navy-yard, Norfolk, Va	Oct. 1, 1893	Oct. 5, 1893		
Charlotte Amalia, St. Thomas	Oct. 12, 1893	Oct. 13, 1893	1,251	
Bridgetown, Barbadoes	Oct. 15, 1893	Oct. 17, 1893	414	
Bahia, Brazil	Oct. 28, 1893	Oct. 30, 1893	2,385	
Rio de Janeiro, Brazil	Nov. 2, 1893	Nov. 26, 1893	601	
Do	Nov. 26, 1893	Jan. 9, 1894	10	
Taipu Beach, Brazil	Jan. 9, 1894	Jan. 13, 1894	10	To protect American interests.
Rio de Janeiro, Brazil	Jan. 13, 1894	Feb. 9, 1894	200	
Santos, Brazil	Feb. 10, 1894	Feb. 11, 1894	153	
Paranaqua, Brazil	Feb. 12, 1894	Feb. 14, 1894	153	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Santos, Brazil	Feb. 15, 1894	Feb. 17, 1894	223	
Rio de Janeiro, Brazil	Feb. 18, 1894	Feb. 21, 1894	20	
Do	Feb. 21, 1894	Feb. 24, 1894	10	
Taipu Beach, Brazil	Feb. 24, 1894	Mar. 10, 1894	10	
Rio de Janeiro, Brazil	Mar. 10, 1894	Mar. 14, 1894	10	
Taipu Beach, Brazil	Mar. 14, 1894	Mar. 17, 1894	10	
Rio de Janeiro, Brazil	Mar. 17, 1894	Mar. 19, 1894	1,078	Proceeding to Ham Roads, Virginia.
Pernambuco, Brazil	Mar. 25, 1894	Mar. 30, 1894	170	
Charlotte Amalia, St. Thomas, West Indies.	Apr. 12, 1894	Apr. 5, 894	2,595.1	
Murry Anchorage, Bermuda	Apr. 20, 1894	Apr. 21, 1894	837	
Hampton Roads, Virginia	Apr. 24, 1894	Apr. 26, 1894	712	
Navy-yard, Norfolk, Va	Apr. 26, 1894		12	
Dry dock	do			
Do		May 26, 1894		
Moored to wharf, N. 11° W	May 26, 1894			Assigned to Asiatic S Oct. 1.
Total distance sailed			10,864.1	
Marblehead, Commander CHARLES O'NEIL, commanding.				Commissioned Apr. 2 Assigned to North tic Station Apr. 4.
New York		June 6, 1894		
Newport R. I	June 7, 1894	June 7, 1894	160	
Kingston, Jamaica	June 13, 1894	June 16, 1894	1,560	
Bluefields, Nicaragua	June 19, 1894	July 7, 1894	595	To protect American ests.
Port Limon, Costa Rica	July 8, 1894	July 8, 1894	125	
Bluefields, Nicaragua	July 9, 1894	Aug. 12, 1894	125	
Great Corn Island	Aug. 12, 1894	Aug. 13, 1894	40	
Little Corn Island	Aug. 13, 1894	Aug. 22, 1894	18	
Bluefields, Nicaragua	Aug. 22, 1894	Sept. 13, 1894	45	
Port Limon, Costa Rica	Sept. 14, 1894	Sept. 24, 1894	125	
Greytown, Nicaragua	Sept. 24, 1894	Sept. 25, 1894	75	
Bluefields, Nicaragua	Sept. 25, 1894		65	
Total distance sailed			2,933	
Montgomery, Commander C. H. DAVIS, commanding.				Commissioned June 2: Unassigned.
Norfolk, Va		July 1, 1894		
Hampton Roads, Virginia	July 1, 1894	July 2, 1894	12	
Do		July 3, 1894	12	
Norfolk, Va	July 5, 1894	Aug. 12, 1894		
Southport, N. C	Aug. 15, 1894	Aug. 21, 1894	299	Temporary duty in c tion with drills of Carolina naval milit
Hampton Roads, Virginia	Aug. 23, 1894	Aug. 27, 1894	309	
Yorktown, Va	Aug. 27, 1894	Sept. 10, 1894	34	
Hampton Roads, Virginia	Sept. 10, 1894	Sept. 18, 1894	34	
Norfolk, Va	Sept. 18, 1894	Sept. 30, 1894	12	
Total distance sailed			712	
Marion, Commander C. V. GRIDLEY, commanding.				Asiatic Station.
Hankow, China	June 11, 1893	July 5, 1893	584	
Shanghai, China	July 8, 1893	July 15, 1893	504	
Chemulpo, Korea	July 19, 1893	July 24, 1893	762	
Kobe, Japan	July 29, 1893	July 31, 1893	347	
Yokohama, Japan	Aug. 2, 1893	Sept. 17, 1893	340	
Do	Sept 20, 1893	Dec. 3, 1893	165	
Mehawa Bay, Japan	Dec. 4, 1893	Dec. 5, 1893	187	
Yokohama, Japan	Dec. 6, 1893	Feb. 19, 1894	1,373	Assigned to Pacific S Jan. 25; put back to hama for repairs.
Do	Mar. 2, 1894	Apr. 10, 1894	4,212	
Honolulu, Hawaiian Islands	May 17, 1894	May 24, 1894	2,355	
Mare Island navy-yard	June 12, 1894			Placed out of comm July 10.
Total distance sailed			10,829	
Mohican, Commander NICOLL LUDLOW, commanding. Relieved by Commander C. E. CLARK Nov. 30, 1893.				Pacific Station.
Unalaska, Alaska	July 1, 1893	July 12, 1893		Cruising in Bering Sea nection with seal fis

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
St. George, Pribyloff Islands	July 13, 1893	July 14, 1893	184.8	
St. Paul, Pribyloff Islands	July 14, 1893	July 15, 1893	67.3	
Do	July 15, 1893	July 17, 1893	42.9	
St. George, Pribyloff Islands	July 17, 1893	July 19, 1893	40.1	
St. Paul, Pribyloff Islands	July 19, 1893	July 22, 1893	36.1	
Do	July 22, 1893	July 24, 1893	45.2	
Do	July 24, 1893	July 25, 1893	17.5	
Do	July 25, 1893	July 26, 1893	27.7	
Do	July 26, 1893	July 29, 1893	8.5	
Do	July 29, 1893	July 30, 1893	19.4	
St. George, Pribyloff Islands	July 31, 1893	Aug. 1, 1893	72.5	
Unalaska, Alaska	Aug. 4, 1893	Aug. 12, 1893	556	
Do	Aug. 12, 1893	Aug. 15, 1893	51.2	
Makushen Bay, Unalaska Island, Alaska.	Aug. 15, 1893	Aug. 17, 1893	40	
Chernofsky Harbor, Unalaska Island, Alaska.	Aug. 17, 1893	Aug. 21, 1893	333.1	
Dutch Harbor, Unalaska Island, Alaska.	Aug. 23, 1893	Sept. 23, 1893	1,180.4	
Sitka, Alaska	Sept. 29, 1893	Oct. 4, 1893	.....	
Alexander Bay, Galian Island, British Columbia.	Oct. 7, 1893	Oct. 8, 1893	563.6	
Alert Bay, Comorant Island, British Columbia.	Oct. 8, 1893	Oct. 9, 1893	33.9	
Plumper Bay, Vancouver Island, British Columbia.	Oct. 9, 1893	....do.....	66.1	
Duncan Bay, Vancouver Island, British Columbia.	....do.....	Oct. 10, 1893	12	
Comax Bay, Vancouver Island, British Columbia.	Oct. 10, 1893	Oct. 12, 1893	65	
Departure Bay, Vancouver Island, British Columbia.	Oct. 12, 1893	Oct. 13, 1893	53.2	
Port Townsend, Wash.	Oct. 13, 1893	Oct. 16, 1893	88.8	
San Francisco, Cal.	Oct. 20, 1893	Oct. 20, 1893	781.1	
Mare Island, Cal. (navy-yard)	....do.....	Mar. 28, 1894	32	
Port Townsend, Wash	Apr. 1, 1894	Apr. 23, 1894	.....	
Seattle, Wash	Apr. 23, 1894	Apr. 26, 1894	36	
Port Townsend, Wash	Apr. 26, 1894	May 17, 1894	35	
Tribune Bay, British Columbia	May 17, 1894	May 18, 1894	125	
Alert Bay, British Columbia	May 19, 1894	May 19, 1894	111	
Sitka, Alaska	May 26, 1894	May 28, 1894	1,304	
Do	June 3, 1894	June 8, 1894	1,140	
Do	June 11, 1894	June 13, 1894	610	
Port Etches, Alaska	June 16, 1894	June 19, 1894	527	
Cooks Inlet, Alaska	June 20, 1894	June 21, 1894	306	
Do	June 21, 1894	June 22, 1894	64	
Do	June 23, 1894	June 25, 1894	100	
Sand Point, Alaska	June 27, 1894	June 27, 1894	389	
Beaver Bay, Alaska	....do.....	June 29, 1894	60	
Unalaska, Alaska	June 30, 1894	.....	253	
Total distance sailed	.....	.....	9,478.4	Cruising report for quarter ending Sept. 30 not received.
Bennington, Commander R. B. BRADFORD, commanding. Relieved by Commander C. M. THOMAS, July 20, 1893.	.....	.....	.....	European Station.
U. S. navy-yard, New York	May 24, 1893	Aug. 6, 1893	.....	
Lisbon, Portugal	Aug. 18, 1893	Aug. 22, 1893	2,990	Proceeding to European Station.
Southampton, England	Aug. 26, 1893	Sept. 11, 1893	892	
Brest, France	Sept. 12, 1893	Sept. 13, 1893	261	
Ferrol, Spain	Sept. 15, 1893	Sept. 16, 1893	368	
Corunna, Spain	Sept. 16, 1893	Sept. 26, 1893	12	
Ferrol, Spain	Sept. 26, 1893	Oct. 1, 1893	12	
Gibraltar	Oct. 5, 1893	Oct. 11, 1893	671.5	
Malaga, Spain	Oct. 12, 1893	Oct. 23, 1893	65	
Melilla, Morocco	Oct. 24, 1893	Oct. 24, 1893	121	
Barcelona, Spain	Oct. 27, 1893	Nov. 3, 1893	451.5	
Marseilles, France	Nov. 4, 1893	Nov. 16, 1893	182	
Genoa, Italy	Nov. 17, 1893	Nov. 24, 1893	207	
Ajaccio, Corsica	Nov. 25, 1893	Nov. 27, 1893	170	
Civita Vecchia, Italy	Nov. 28, 1893	Dec. 4, 1893	175	
Genoa, Italy	Dec. 5, 1893	Dec. 6, 1893	193.8	
Tangier, Morocco	Dec. 10, 1893	Dec. 11, 1893	894.2	
Gibraltar	Dec. 11, 1893	....do.....	33	
Oran, Algeria	Dec. 12, 1893	Dec. 12, 1893	239.5	
Algiers, Algeria	Dec. 13, 1893	Dec. 17, 1893	217.7	
Villefranche, France	Dec. 19, 1893	Feb. 1, 1894	4,625	Ordered to Pacific Station.

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Genoa	Feb. 2, 1894	Feb. 7, 1894	96	
Gibraltar	Feb. 10, 1894	Feb. 18, 1894	880	
St. Vincent	Feb. 25, 1894	Feb. 26, 1894	1,585	
Pernambuco	Mar. 6, 1894	Mar. 9, 1894	1,654	
Montevideo	Mar. 18, 1894	Mar. 20, 1894	2,136	
At sea, latitude 40° 58′ S.; longitude 74° 14′ W.	April 1, 1894.		2,294	
Valparaiso, Chile	Apr. 3, 1894	Apr. 5, 1894	539	
Callao, Peru	Apr. 10, 1894	Apr. 11, 1894	1,310	
Acapulco, Mexico	Apr. 21, 1894	Apr. 21, 1894	2,235	
Mare Island navy-yard	Apr. 30, 1894	May 9, 1894	1,897	Ordered to San Salvad protect American i ests.
Acapulco, Mexico	May 16, 1894	May 17, 1894	1,851	
La Libertad, Salvador	May 21, 1894	July 25, 1894	675	
Acajutla, Salvador	July 25, 1894	July 26, 1894	40	
Acapulco, Mexico	July 30, 1894	Aug. 2, 1894	648	
Off San Francisco	Aug. 14, 1894	Aug. 23, 1894	1,894	
Navy-yard, Mare Island	Aug. 23, 1894	.....	186	
Total distance sailed	.....	.....	32,701.2	
Concord, Commander C. F. GOODRICH, commanding.				
Norfolk, Va	May 5, 1893	July 3, 1893	.....	Ordered to Asiatic St June 28, 1893.
Ponta Delgada, Azores	July 13, 1893	July 17, 1893	2,450	
Gibraltar	July 22, 1893	July 26, 1893	1,001	
Malta	July 30, 1893	Aug. 2, 1893	990	
Port Said, Egypt	Aug. 7, 1893	Aug. 9, 1893	971	
Ismailia, Egypt	Aug. 9, 1893	Aug. 11, 1893	33	
Suez, Egypt	Aug. 11, 1893	Aug. 12, 1893	57	
Perim, Strait of Bab-el-Mandeb	Aug. 18, 1893	Aug. 21, 1893	1,213	
Colombo, Ceylon	Aug. 31, 1893	Sept. 12, 1893	2,194	
Singapore, Straits Settlements	Sept. 24, 1893	Sept. 25, 1893	1,719	
Bangkok, Siam	Sept. 29, 1893	Oct. 5, 1893	818	
Koh Si Chang, Siam	Oct. 5, 1893	Oct. 6, 1893	254	
Rong Sam Lem, Siam	Oct. 7, 1893	Oct. 14, 1893	412	
Saijon, Cochin China	Oct. 15, 1893	Oct. 25, 1893	948	
Hongkong, China	Oct. 30, 1893	Dec. 18, 1893	845	
Shanghai, China	Dec. 23, 1893	Dec. 30, 1893	.....	
Nagasaki, Japan	Jan. 1, 1894	Jan. 4, 1894	400	
Yokohama, Japan	Jan. 8, 1894	Feb. 17, 1894	753	
Shanghai, China	Feb. 25, 1894	Feb. 28, 1894	1,252	
Amoy, China	Mar. 2, 1894	Mar. 12, 1894	448	
Manila, Philippine Islands	Mar. 15, 1894	Mar. 19, 1894	657	
Hongkong	Mar. 23, 1894	Apr. 14, 1894	620	
Nagasaki	Apr. 18, 1894	Apr. 18, 1894	1,143	
Yokohama	Apr. 21, 1894	May 16, 1894	693	Ordered to temporary with Bering Sea fleet
Unalaska	May 29, 1894	June 1, 1894	2,656	
Alitak Bay, Kadiak Island	June 4, 1894	June 6, 1894	484	
St. Paul, Kadiak Island	June 10, 1894	June 11, 1894	674	
	June 12, 1894	June 13, 1894	266	
Alitak Bay	June 14, 1894	June 14, 1894	159	
Sand Point, Shumagin Islands	June 15, 1894	June 15, 1894	277	
Unalaska	June 16, 1894	June 21, 1894	378	
At sea	June 30, 1894	.....	1,210	
Total distance sailed	.....	.....	25,984	Cruising report for qu ending Sept. 30 not rece
Yorktown, Commander FRANK WILDES, commanding. Commander P. F. HARRINGTON assumed command July 17, 1893. Relieved by Commander W. M. FOLGER, Jan. 29, 1894.				
Navy-yard, New York	May 3, 1893	July 20, 1893	.....	Assigned to Pacific Stat
Tompkinsville, N. Y	July 20, 1893	July 22, 1893	7	En route to Callao, Per
Bridgetown, Barbados	July 31, 1893	Aug. 3, 1893	2,174	
Rio de Janeiro, Brazil	Aug. 19, 1893	Aug. 28, 1893	3,602	
Montevideo, Uruguay	Sept. 1, 1893	Sept. 3, 1893	1,030	
Punta Arenas, Straits of Magellan.	Sept. 10, 1893	Sept. 16, 1893	1,443	
Callao, Peru	Sept. 29, 1893	.....	2,745	
Do	....do	Oct. 23, 1893	15	
San Lorenzo Island	Oct. 23, 1893	Nov. 2, 1893	15	
Callao, Peru	Nov. 2, 1893	.....	.....	
Do	Sept. 29, 1893	Feb. 3, 1894	.....	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Ancon, Peru	Feb. 3, 1894	Feb. 5, 1894	20	
Eten, Peru	Feb. 7, 1894	Feb. 7, 1894	366	
Payta, Peru	Feb. 8, 1894	Feb. 8, 1894	178	
Tumbez, Peru	Feb. 9, 1894	Feb. 10, 1894	146	
Panama, United States of Colombia.	Feb. 13, 1894	Feb. 16, 1894	770	
La Union, Salvador	Feb. 19, 1894	Feb. 19, 1894	781	To protect American interests.
Acapulco, Mexico	Feb. 23 1894	Feb. 24, 1894	756	
San Francisco, Cal.	Mar 3, 1894	Mar. 5, 1894	1,831	
Mare Island navy-yard	Mar. 5, 1894	Mar. 31, 1894	25	
At sea, making passage to Port Townsend, Wash.	Mar. 31, 1894	.....	180	
San Francisco, Cal.	.....	Mar 31, 1894	811	
Port Townsend, Wash	Apr. 3, 1894	Apr. 9, 1894	40	
Seattle, Wash	Apr 9, 1894	Apr. 12, 1894	118	Making tests of coal.
Do	Apr. 12, 1894	Apr. 14, 1894	60	Ordered to temporary duty with Bering Sea fleet.
Do	Apr. 14, 1894	Apr. 19, 1894	78	
New Whatcom, Wash	Apr. 19, 1894	Apr. 20, 1894	71	
Do	Apr. 20, 1894	Apr. 21, 1894	75	
Seattle, Wash	Apr. 21, 1894	....do	25	
Tacoma, Wash	....do	Apr. 24, 1894	25	
Seattle, Wash	Apr. 24, 1894	Apr. 26, 1894	77	
New Whatcom	Apr. 26, 1894	Apr. 30, 1894	40	
Port Townsend	Apr. 30, 1894	May 14, 1894	40	
New Whatcom	May 14, 1894	....do	40	
Port Townsend	....do	May 16, 1894	1,489	
Sand Point, Popoff Island	May 23, 1894	May 28, 1894	29	
Sandborn Harbor, Nagai Islands.	May 28, 1894	May 29, 1894	413	
Dutch Harbor, Unalaska	May 30, 1894	June 4, 1894	799	
St. Paul, Kadiak	June 9, 1894	June 9, 1894	632	
Sitka, Alaska	June 11, 1894	June 15, 1894	436	
Port Etches	June 17, 1894	June 18, 1894	322	
Coal Harbor, Kachemak Bay	June 19, 1894	June 20, 1894	94	
Do	June 20, 1894	June 22, 1894	180	
Karluk, Kadiak	June 23, 1894	June 23, 1894	956	
Sitka, Alaska	June 27, 1894	June 29, 1894	1,069	
Portage Bay, Alaska	July 4, 1894	July 7, 1894	447	
Unalaska	July 9, 1894	July 14, 1894	255	
St. Paul Island	July 15, 1894	Aug. 5, 1894	353	
St. Matthews Island	Aug. 8, 1894	Aug. 11, 1894	469	
Unalaska	Aug. 13, 1894	Aug. 18, 1894	1,122	
Sitka	Aug. 24, 1894	Sept. 1, 1894	1,132	
Unalaska	Sept. 6, 1894	Sept. 8, 1894	923	
Do	Sept. 11, 1894	Sept. 15, 1894	2,102	
San Francisco	Sept. 24, 1894	Sept. 24, 1894	25	
Navy-yard, Mare Island	....do	.....	.....	Assigned to Asiatic Station.
Total distance sailed	.....	.....	30,831	
Kearsarge, Commander A. S. CROWNINSHIELD, commanding. Relieved by Commander O. F. HEYERMAN, Nov. 23, 1893.	.....	.....	.....	North Atlantic Station.
North River, New York	Sept. 29, 1893	Oct. 1, 1893	107.5	
New London Conn	Oct. 2, 1893	Oct. 5, 1893	107.5	
North River, New York	Oct. 6 1893	Oct. 18, 1893	30	
Sandy Hook, New Jersey	Oct. 18, 1893	Oct. 19, 1893	26	
North River, New York	Oct 19, 1893	Nov. 1, 1893	236	
Off Cape Henry, Virginia	Nov. 3, 1893	Nov. 4, 1893	450	
Boston, Mass., touching at Vineyard Haven, Mass	Nov 8, 1893	Nov. 16, 1893	59	
Gloucester, Mass	Nov. 16, 1893	Nov. 18, 1893	59	Duty in connection with trial of *Columbia*.
Boston, Mass	Nov. 18, 1893	Nov. 19, 1893	125	
Newport R. I.	Nov. 20, 1893	Nov. 21, 1893	133	
Navy-yard, New York	Nov. 22, 1893	Dec. 2, 1893	101	
New London, Conn	Dec. 3, 1893	Dec. 8, 1893	107.5	Duty in connection with trial of *Marblehead*.
North River New York	Dec 9 1893	Dec. 21, 1893	1,580	
San Domingo City San Domingo	Dec 30, 1893	Dec. 31, 1893	65	
Azua, San Domingo	Dec 31, 1893	Jan. 7, 1894	420	
Port au Prince, Haiti	Jan 12 1894	.....	.....	Wrecked on Roncador Reef Feb. 2, 1894.
Total distance sailed	.....	.....	3,615.5	
Dolphin, Lieut B H. BUCKINGHAM, commanding.				
New London	*Sept 27, 1893*	Oct. 2 1893	13	Special service.

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Trial course, Long Island Sound	Oct. 2, 1893	Oct. 2, 1894	53	
New London	....do	Oct. 6, 1893	53	
New York	Oct. 6, 1893	Oct. 28, 1893	103	
Boston	Oct. 29, 1893	Nov. 6, 1893	282	
Gloucester	Nov. 6, 1893	Nov. 12, 1893	20	
Over trial course to Cape Porpoise and back to Boston	Nov. 12, 1893	Nov. 15, 1893	130	Duty in connection with trial of *Columbia.*
Gloucester	Nov. 15, 1893	Nov. 16, 1893	20	
To Buoy A at trial course	Nov. 16, 1893	....do	9	
Gloucester	....do	Nov. 17, 1893	9	
Over trial course and back to Gloucester	Nov. 17, 1893	Nov. 18, 1893	106	
To Buoy A	Nov. 18, 1893	....do	9	
Boston	....do	Nov. 23, 1893	32	
New York	Nov. 24, 1893	Dec. 2, 1893	282	
New London	Dec. 3, 1893	Dec. 7, 1893	103	
To third buoy at Long Island Sound trial course.	Dec. 7, 1893	....do	30	
New London	....do	....do	30	Duty in connection with trial of *Marblehead.*
New York	Dec. 8, 1893	Jan. 11, 1894	103	
New London	Jan. 11, 1894	Jan. 20, 1894	103	Duty in connection with trial of *Montgomery.*
New York	Jan. 21, 1894	Feb. 18, 1894	103	
Washington	Feb. 20, 1894	May 3, 1894	400	
Old Point Comfort, Va	May 3, 1894	May 4, 1894	169	
Norfolk, Va	May 4, 1894	May 19, 1894	15	
Washington, D. C	May 20, 1894	June 20, 1894	184	
New London	June 22, 1894	July 5, 1894	500	
Gloucester, Mass	July 6, 1894	July 8, 1894	186	Duty in connection with trial of *Minneapolis.*
Cape Porpoise, Maine	July 8, 1894	....do	55	
Gloucester, Mass	....do	July 12, 1894	55	
Portland, Me	July 12, 1894	July 14, 1894	78	
Boston, Mass	July 14, 1894	July 20, 1894	100	
New York, N. Y	July 22, 1894	July 23, 1894	275	Inspection of naval reserve
New London, Conn	July 23, 1894	July 24, 1894	100	
Gardiner's Bay, N. Y	July 24, 1894	July 25, 1894	14	
Boston, Mass	July 26, 1894	July 27, 1894	185	
Massachusetts Bay (off Boston)	July 27, 1894	....do	15	
Boston, Mass	....do	Aug. 1, 1894	15	
New London, Conn	Aug. 1, 1894	Aug. 7, 1894	184	
Washington, D. C	Aug. 9, 1894	Aug. 16, 1894	500	Annual inspection by Secretary of the Navy.
New York, N. Y	Aug. 17, 1894	Aug. 20 1894	430	
Newport, R. I	Aug. 21, 1894	Aug. 30, 1894	142	
West Island, Rhode Island (mouth Sakonnet River).	Aug. 30, 1894	Sept. 1, 1894	15	
Woods Holl, Mass	Sept. 1, 1894	Sept. 4, 1894	30	
Boston, Mass	Sept. 4, 1894	Sept. 6, 1894	120	
Buzzards Bay, Mass	Sept. 6, 1894	Sept. 9, 1894	148	
New London, Conn	Sept. 9, 1894	Sept. 12, 1894	76	
Norfolk, Va	Sept. 13, 1894	Sept. 14, 1894	359	
Washington, D. C	Sept. 15, 1894	Sept. 20, 1894	171	
New London, Conn	Sept. 22, 1894	Sept. 25, 1894	500	
New York, N. Y	Sept. 25, 1894	Sept. 29, 1894	100	
New London, Conn	Sept. 29, 1894	.....	100	Duty in connection with trial of *Ericsson.*
Total distance sailed	.....	.....	6,814	
U. S. S. Adams, Commander THOMAS NELSON, commanding. Relieved by Commander J. J. BRICK, March 24, 1894	.....	.....	.....	Pacific Station.
Honolulu, Hawaiian Islands	July 2, 1893	Apr. 15, 1894	.....	Assigned to temporary duty with Bering Sea Fleet.
Port Townsend, Wash	May 1, 1894	May 4, 1894	2,841.6	
Do	....do	....do	.....	
Quartermaster's Harbor, Wash	May 4, 1894	May 6, 1894	44.7	
Tacoma, Wash	May 6, 1894	May 7, 1894	6.0	
New Whatcom, Wash	May 7, 1894	May 10, 1894	57.3	
Port Townsend, Wash	May 10, 1894	May 17, 1894	46.0	
Sitka, Alaska	May 26, 1894	May 29, 1894	1,554.7	
Port Etches, Alaska	June 1, 1894	June 2, 1894	500.7	
St. Paul, Kadiak, Alaska	June 4, 1894	June 4, 1894	340.5	
Sitka, Alaska	June 10, 1894	June 14, 1894	934.3	
Do	June 20, 1894	June 21, 1894	1,017.2	
Sand Point, Shumazin Islands	June 27, 1894	June 27, 1894	913.2	
Unalaska, Dutch Harbor	June 29, 1894	July 2, 1894	307.1	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Belkoffsky, Alaska	July 12, 1894	July 14, 1894	.....	
Unalaska, Alaska	July 17, 1894	July 20, 1894	979.9	
St George, Pribilof group	July 21, 1894	July 29, 1894	204.1	
St. Paul, Pribilof group	July 29, 1894	July 29, 1894	.....	
St. George, Pribilof group	....do.....	....do.....	73	
St. Paul, Pribiloff group	Aug. 2, 1894	Aug. 7, 1894	38.2	
Unalaska	Aug. 11, 1894	Aug. 18, 1894	979.5	
Sitka, Alaska	Aug. 24, 1894	Aug. 29, 1894	1,122.1	
New Whatcom, Wash	Sept. 5, 1894	Sept. 9, 1894	891.3	
San Francisco, Cal	Sept. 12, 1894	Sept. 13, 1894	757.4	
Mare Island, Cal	Sept. 13, 1894	.....	30.0	
Total distance sailed	.....	.....	13,638.8	
Alliance, Commander W. H. WHITING, commanding. Relieved by Commander T. A. LYONS. October 26 1893.	.....	.....	.....	Pacific Station.
Callao, Peru	June 24, 1893	July 20, 1893	1,360	
Panama, United States of Colombia	July 26, 1893	Aug. 1, 1893	726	
Corinto, Nicaragua	Aug. 5, 1893	Sept. 17, 1893	222	Cruising to protect American interests.
San Jose de Gautemala	Sept. 18, 1893	Sept. 18, 1893	277	
Corinto, Nicaragua	Sept. 20, 1893	Oct. 17, 1893	.....	
San José de Gautemala	Oct. 18, 1893	Nov 7, 1893	224	
Acajutla, Salvador	Nov. 8, 1893	Nov. 9, 1893	60	
La Libertad, Salvador	Nov. 9, 1893	Nov. 13, 1893	47	
Corinto, Nicaragua	Nov. 14, 1893	Dec. 5, 1893	195	
Gulf of Fonseca, off Consequina Point.	Dec. 5, 1893	Dec. 6, 1893	46	
Bay of La Union	Dec. 6, 1893	Dec. 19, 1893	10	
Amapala, Honduras	Dec. 19, 1893	Dec. 20, 1893	21	
La Libertad, Salvador	Dec. 21, 1893	Dec, 27, 1893	116	
Salvador to Callao, Peru	Jan. 10, 1894	Jan. 31, 1894	1,877	Transferred to South Atlantic Station.
Port Otway, Gulf of Peñas, Patagonia.	Mar. 2, 1894	Mar. 3, 1894	2,965	
Island Harbor, Messier Channel, Patagonia.	Mar. 3, 1894	Mar. 4, 1894	84	
Gray Harbor, English Narrows, Patagonia.	Mar. 4, 1894	Mar. 5, 1894	55	
Port Grappler, Indian Reach, Patagonia.	Mar. 5, 1894	Mar. 6, 1894	41	
Molyneux Sound, Concepcion Channel, Patagonia.	Mar. 6, 1894	Mar. 7, 1894	63	
Puerto Bueno, Sarimento Channel, Patagonia.	Mar. 7, 1894	Mar. 8, 1894	50	
Isthmus Bay, Smyth Channel, Patagonia.	Mar. 8, 1894	Mar. 9, 1894	81	
Otter Bay, Smyth Channel, Patagonia.	Mar. 9, 1894	Mar. 11, 1894	12	
Glacier Bay, Magellan Straits.	Mar. 11, 1894	Mar. 12, 1894	79	
Port Famine, Magellan Straits	Mar. 12, 1894	Mar. 13, 1894	96	
Punta Arenas, Magellan Straits.	Mar. 13, 1894	Mar. 18, 1894	28	
Gregory Bay, Magellan Straits	Mar. 18, 1894	Mar. 19, 1894	44	
Montevideo, Uruguay	Mar. 30, 1894	Apr. 18, 1894	1,360	
Bridgetown, Barbados	June 2, 1894	June 2, 1894	5,392	En route to Norfolk, Va.
Port Castries, Santa Lucia, West Indies.	June 3, 1894	June 7, 1894	116	
Charlotte Amalia, St. Thomas	June 9, 1894	June 9, 1894	412	
Hampton Roads, Va	June 18, 1894	June 19, 1894	1,346	
Norfolk navy-yard	June 19, 1894	.....	12	Placed out of commission June 30, 1894.
Total distance sailed	.....	.....	17,417	
Essex, Commander W. W. MEADE, commanding. Commander F. W. DICKINS assumed command Jan. 31, 1894. Relieved by Commander L. KINGSLEY July 9, 1894.	.....	.....	.....	Recommissioned Jan. 31, 1894.
Navy-yard, Norfolk, Va	Jan. 31, 1894	.....	.....	
Lynn Haven Bay	Feb. 21, 1894	Feb. 23, 1894	25	
Newport, R. I	Feb. 25, 1894	Mar. 6, 1894	343	Practice cruise for instruction of naval apprentices.
Latitude 27° 45′ N., longitude 75° 30′ W.	Mar. 31, 1894	.....	1,838	
Latitude 28° 22′ N., longitude 76° 30′ W.	.....	Apr. 1, 1894	.....	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Entrance to Swash Channel, Charleston, S. C.	Apr. 4, 1894	Apr. 5, 1894	362.6	
Charleston, S. C	Apr. 5, 1894	Apr. 19, 1894	12	
Yorktown, Va	May 8, 1894	May 28, 1894	1,484.9	Engaged in target practice.
Navy-yard, Norfolk, Va	May 28, 1894	June 11, 1894	43	
Latitude 41° 08′ N., longitude 67° 30′ W. Latitude 40° 47′, longitude 70° N., 11′ W.	June 30, 1894	July 1, 1894	1,450.7	
Newport, R. I	July 2, 1894	July 4, 1894	76	
New York navy-yard	July 5, 1894	July 6, 1894	123	Annual summer cruise for instruction of naval apprentices.
Newport, R. I	July 7, 1894	July 17, 1894	123	
Southampton, England	Aug. 23, 1894	Sept. 1, 1894	3,286	
Havre, France	Sept. 2, 1894	Sept. 6, 1894	82.1	
Southampton, England	Sept. 7, 1894	Sept. 8, 1894	90.4	
Total distance sailed			9,339.7	
Monocacy, Commander F. M. BARBER, commanding. Relieved by Commander R. E. IMPEY October, 11, 1893.				Asiatic Station.
Hankow, China	June 3, 1893	July 22, 1893	370	
Chinkiang, China	July 24, 1893	Sept. 3, 1893	428	
Saddle Islands, China	Sept. 4, 1893	Sept. 6, 1893	207	
Shanghai, China	Sept. 6, 1893	Dec. 13, 1893	79	
South Bay, Side Saddle Island	Dec. 12, 1893	Dec. 17, 1893	75	
Shanghai	Dec. 18, 1893		75	
Do		Jan. 29, 1894	14	
Woosung	Jan. 30, 1894	Feb. 3, 1894	142	
Chinkiang	Feb. 4, 1894	Feb. 12, 1894	156	
Shanghai	Feb. 13, 1894	Feb. 18, 1894	156	Cruising to protect American interests.
Chinkiang	Feb. 19, 1894	Feb. 24, 1894	156	
Shanghai	Feb. 25, 1894	Mar. 20, 1894	201	
Nanking	Mar. 25, 1894	Mar. 29, 1894	55	
Wuhu	Mar. 29, 1894	Apr. 2, 1894		
Kinkiang	Apr. 3, 1894	Apr. 6, 1894	193	
Woosung	Apr. 9, 1894	Apr. 14, 1894	432	
Shanghai	Apr. 14, 1894	May 12, 1894	12	
Nanking	May 16, 1894	May 20, 1894	201	
Hankow	May 24, 1894	May 28, 1894	393	
Ichang	June 1, 1894	June 9, 1894	395	
Hankow	June 10, 1894	June 16, 1894	395	
Kinkiang	June 16, 1894	June 20, 1894	150	
Wuhu	June 21, 1894	June 26, 1894	193	
Shanghai	June 27, 1894		251	
Total distance sailed			4,729	Cruising report for quarter ending Sept. 30 not received.
Thetis, Lieut. Commander C. T. HUTCHINS, commanding.				Special service.
Mare Island navy-yard		Sept. 17, 1893	28	
San Francisco	Sept. 17, 1893	Sept. 18, 1893	1,073	
Surveying west coast Lower California		Dec. 6, 1893	1,496	
San Diego, Cal	Dec. 10, 1893		562	
Do	...do	Jan. 6, 1894	631	
Do	Mar. 12, 1894	Mar. 22, 1894	1,096	
Magdalena Bay	Apr. 24, 1894	May 3, 1894		
San Diego Harbor	May 8, 1894	May 10, 1894	588	
Mare Island navy-yard	May 14, 1894		429	
Total distance sailed			5,903	Cruising report for quarter ending Sept. 30 not received.
Portsmouth, Commander C. J. BARCLAY, commanding. Relieved by Commander JOHN MCGOWAN, May 25, 1894.				Practice ship for naval apprentices.
Plymouth, England	July 24, 1893	Aug. 10, 1893	3,035	On practice cruise for instruction of naval apprentices.
Funchal, Madeira	Aug. 30, 1893	Sept. 3, 1893	1,510	
At sea	Sept. 30, 1893	Sept. 30, 1893	2,901	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Newport, R. I	Oct. 15, 1893	Oct. 23, 1893	1,164	
New York navy-yard	Oct. 26, 1893	Dec. 1, 1893	150	
Newport, R. I	Dec. 5, 1893	Dec. 13, 1893	150	
At sea	Jan. 1, 1894	Jan. 1, 1894	1,806	
Bridgetown, Barbados	Jan. 7, 1894	Jan. 15, 1894	591	
Fort de France, Martinique	Jan. 17, 1894	Feb. 1, 1894	85	
Port Spain, Trinidad	Feb. 3, 1894	Feb. 21, 1894	153	
Fredericksted, St. Croix	Feb. 26, 1894	Mar. 14, 1894	542	
St. Thomas	Mar. 15, 1894	Mar. 29, 1894	40	
At sea	Mar. 31, 1894	Mar. 31, 1894	219	
Hampton Roads, Va	Apr. 18, 1894	Apr. 27, 1894	1,298	
New York	Apr. 29, 1894	June 23, 1894	230	
Newport, R. I	June 27, 1894		165	
Total distance sailed			14,039	Cruising report for quarter ending Sept. 30 not received.
Machias, Commander C. J. TRAIN, commanding. Relieved by Commander E. S. HOUSTON, Sept. 18, 1894.				Asiatic Station.
Navy-yard, New York				Recommissioned Sept. 18, 1894.
Alert, Commander G. M. BOOK, commanding. Relieved by Commander W. A. MORGAN, Apr. 2, 1894.				Pacific Station.
Navy-yard, Mare Island, Cal	Sept. 23, 1893			Went out of commission Oct. 7, 1893. Recommissioned Apr. 4, 1894.
San Francisco, Cal		Apr. 27, 1894		
Port Townsend, Wash	May 1, 1894	May 2, 1894	860.9	
New Whatcom, Wash	May 2, 1894	May 3, 1894	43	
Port Townsend, Wash	May 4, 1894	May 14, 1894	43	
New Whatcom, Wash	May 14, 1894	May 15, 1894	43	
Port Townsend, Wash	May 15, 1894	May 17, 1894	43	
St. Paul, Kadiak, Alaska	May 26, 1894	May 27, 1894	1,297.1	Cruising in Bering Sea in connection with the seal fisheries.
Dutch Harbor, Unalaska	June 3, 1894	June 6, 1894	865	
Akutan Harbor, Alaska	June 8, 1894	June 15, 1894	363.4	
Dutch Harbor, Unalaska	June 15, 1894	June 17, 1894	48	
St. George, Pribilof Islands	June 18, 1894		246.9	
Total distance sailed			3,853.3	Cruising report for quarter ending Sept. 30 not received.
Ranger, Commander EDWARD LONGNECKER, commanding.				Pacific Station.
San Francisco, Cal	Oct. 1, 1893	Oct. 2, 1893	2,114.5	
Mare Island, Cal	Oct. 2, 1893	Dec. 5, 1893	23.5	
San Francisco, Cal	Dec. 5, 1893	Dec. 6, 1893	23.5	Ordered to proceed to Central American waters to relieve U. S. S. Alliance and protect American interests.
Acapulco, Mexico	Dec. 16, 1893	Dec. 18, 1893	1,868.	
La Libertad, Salvador	Dec. 22, 1893	Dec. 26, 1893	675.8	
Corinto, Nicaragua	Dec. 27, 1893	Jan. 8, 1894	149.5	
Amapala, Honduras	Jan. 9, 1894	Feb. 7, 1894	110	
La Union, Salvador	Feb. 7, 1894	Feb. 20, 1894	25	
La Libertad, Salvador	Feb. 21, 1894	Feb. 26, 1894	117	
Corinto, Nicaragua	Feb. 27, 1894	Mar. 1, 1894	146	
Amapala, Honduras	Mar. 2, 1894	Mar. 5, 1894	72	
Acajutla, Salvador	Mar. 6, 1894	Mar. 6, 1894	155	
San Jose de Guatemala	...do	Mar. 16, 1894	63	
Amapala, Honduras	Mar. 18, 1894	Mar. 24, 1894	210	
San Jose de Guatemala	Mar. 26, 1894	Mar. 27, 1894	210	
Acapulco, Mexico	Mar. 31, 1894	Apr. 3, 1894	615	
San Diego, Cal	Apr. 15, 1894	Apr. 17, 1894	1,488.5	
Mare Island, Cal	Apr. 21, 1894	May 17, 1894	488.5	Undergoing repairs.
Port Townsend, Wash	May 21, 1894	May 22, 1894	802.5	Ordered to temporary duty in Bering Sea in connection with seal fisheries.
New Whatcom, Wash	May 22, 1894	May 23, 1894	41	
Sitka, Alaska	June 3, 1894	June 5, 1894	1,803.5	

THIRD RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Dutch Harbor, Unalaska	June 15, 1894	June 19, 1894	1,681.5	
Cruising in the Bering Sea June 19 to June 30.	.....	.....	676	
Dutch Harbor, Alaska	July 17, 1894	July 18, 1894	454	
Sitka, Alaska	July 24, 1894	July 27, 1894	1,137	
Yakutat	July 29, 1894	July 29, 1894	380.5	
Port Etches, Alaska	July 31, 1894	July 31, 1894	343	
Coal Bay, Alaska	Aug. 5, 1894	Aug. 6, 1894	714.5	
St. Paul, Kadiak Id., Alaska	Aug. 7, 1894	Aug. 8, 1894	210	
Dutch Harbor, Alaska	Aug. 15, 1894	Aug. 18, 1894	990	
Chichagof, Attu Ind., Alaska	Aug. 25, 1894	Aug. 26, 1894	828	
Dutch Harbor, Alaska	Aug. 30, 1894	Sept. 4, 1894	766.5	
Do	Sept. 13, 1894	Sept. 18, 1894	1,678.5	
Do	Sept. 21, 1894	Sept. 26, 1894	762	
Sept. 26 to 30, at sea	.....	.....	1,083.7	
Total distance sailed	.....	.....	22,917	

FOURTH RATE.

Vesuvius, Lieut. Commander FRANK CURTIS, commanding. Relieved by Lieut. Commander H. KNOX, Aug. 2, 1894.	.....	.....	.....	North Atlantic Station.
Navy-yard, New York	Sept. 18, 1893	Oct. 1, 1893	7	
New London, Conn	Oct. 1, 1893	Oct. 6, 1893	101	
North River, New York	Oct. 6, 1893	Oct. 9, 1893	107.4	
Newport, R. I	Oct. 10, 1893	Oct. 10, 1893	142.3	
Delaware Breakwater	Oct. 13, 1893	Oct. 16, 1893	295	Engaged in work of destroying derelicts.
North River, New York	Oct. 19, 1893	Oct. 20, 1893	251.4	
Navy-yard, New York	Oct. 20, 1893	Oct. 25, 1893	7	
Navy-yard, Boston	Oct. 31, 1893	Nov. 3, 1893	620.2	
Navy-yard, New York	Nov. 8, 1893	Nov. 11, 1893	511.5	
Navy-yard, Boston	Nov. 12, 1893	Nov. 15, 1893	282.3	
Gloucester, Mass	Nov. 15, 1893	Nov. 16, 1893	25	Duty in connection with trial of Columbia.
Off Cape Porpoise, Maine	Nov. 16, 1893	Nov. 18, 1893	55	
Navy-yard, Boston	Nov. 18, 1893	Nov. 22, 1893	80	
Gardiner's Bay, Long Island	Nov. 22, 1893	Nov. 26, 1893	201.8	
Navy-yard, New York	Nov. 26, 1893	Dec. 3, 1893	92	
New London, Conn	Dec. 3, 1893	Dec. 6, 1893	100.3	Duty in connection with trial of Marblehead.
Off Stratford Shoal Light	Dec. 6, 1893	Dec. 7, 1893	53.8	
New London, Conn	Dec. 7, 1893	Dec. 8, 1893	51.5	
Navy-yard New York	Dec. 8, 1893	.....	100.8	
Do	...do	Jan. 14, 1894	102	
New London, Conn	Jan. 14, 1894	Jan. 18, 1894	52	
Station F, Stratford Shoal Light	Jan. 18, 1894	Jan. 19, 1894	52	
New London, Conn	Jan. 19, 1894	Jan. 20, 1894	101	Duty in connection with trial of Montgomery.
Navy-yard, New York	Jan. 20, 1894	Jan. 24, 1894	142	
Lewes, Del	Jan. 26, 1894	Jan. 28, 1894	66	
Hampton Roads, Va	Feb. 2, 1894	Feb. 6, 1894	213	
Lewes, Del	Feb. 7, 1894	Feb. 11, 1894	215	
Hampton Roads, Va	Feb. 11, 1894	Feb. 13, 1894	150	
Navy-yard, Norfolk, Va	Feb. 13, 1894	Mar. 6, 1894	12	
Yorktown, Va	Mar. 11, 1894	Mar. 13, 1894	42	
Hampton Roads, Va	Mar. 13, 1894	Mar. 22, 1894	31	
Cape Hatteras	Mar. 22, 1894	Mar. 24, 1894	128	
Hampton Roads, Va	Mar. 24, 1894	Mar. 27, 1894	128	
Navy-yard, Norfolk, Va	Mar. 28, 1894	Apr. 19, 1894	12	
Frying Pan Shoal Light Ship	Apr. 25, 1894	Apr. 27, 1894	419	
Hampton Roads, Va	Apr. 28, 1894	May 3, 1894	351	
Navy-yard, Norfolk, Va	May 3, 1894	May 6, 1894	11	
Boston, Mass	May 10, 1894	May 28, 1894	596	
Navy-yard, New York	May 30, 1894	June 27, 1894	283	
New London, Conn	June 30, 1894	July 4, 1894	125	
Boston, Mass	July 5, 1894	July 8, 1894	194	
Gloucester, Mass	July 8, 1894	July 13, 1894	24.6	Duty in connection with trial of Minneapolis.
Boston, Mass	July 14, 1894	Aug. 3, 1894	122.8	
New York, N. Y	Aug. 4, 1894	.....	282.3	
Total distance sailed	.....	.....	6,940	

FOURTH RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Iantic, Lieut. Commander HENRY W. LYON, commanding. Relieved by Lieut. Commander S. M. ACKLEY, Dec. 14, 1893.	.....	.....	.....	South Atlantic Station.
Rosario, Argentine Republic	June 28, 1893	Aug. 8, 1893	67.5	
Dos Hermanos, Argentine Republic.	Aug. 11, 1893	Aug. 16, 1893	75	
Rosario, Argentine Republic	Aug. 16, 1893	Aug. 31, 1893	75	
San Pedro, Argentine Republic	Aug. 31, 1893	Sept. 1, 1893	70	Cruising to protect American interests.
Colonia, Uruguay	Sept. 2, 1893	Sept. 12, 1893	125	
Ensenada, Argentine Republic	Sept. 12, 1893	Sept. 16, 1893	40	
Colonia, Uruguay	Sept. 16, 1893	Sept. 29, 1893	40	
Ensenada, Argentine Republic	Sept. 29, 1893	Sept. 30, 1893	40	
Rosario, Argentine Republic	Oct. 2, 1893	Oct. 7, 1893	290	
Colonia, Uruguay	Oct. 9, 1893	Oct. 9, 1893	230	
Montevideo, Uruguay	Oct. 10, 1893	Oct. 14, 1893	120	
Colonia, Uruguay	Oct. 15, 1893	Nov. 16, 1893	120	
Ensenada, Argentine Republic	Nov. 16, 1893	Nov. 21, 1893	35	
Colonia, Uruguay	Nov. 21, 1893	Nov. 29, 1893	35	
Montevideo, Uruguay	Nov. 30, 1893	Dec. 9, 1893	120	
Colonia, Uruguay	Dec. 10, 1893	Dec. 20, 1893	35	
Ensenada, Argentine Republic	Dec. 20, 1893	Dec. 27, 1893	35	
Montevideo, Uruguay	Dec. 28, 1893	Feb. 2, 1894	110	
Do	Feb. 2, 1894	Mar. 2, 1894	.....	
Do	Mar. 2 1894	Mar. 14, 1894	86.1	
Do	Mar. 15, 1894	Mar. 21, 1894	98.9	
Do	Mar. 22, 1894	May 23, 1894	.....	
Ensenada, Argentine Republic	May 25, 1894	June 6, 1894	110	
Roman Chico, Uruguay	June 8, 1894	June 11, 1894	170	
New Berlin, Uruguay	June 11, 1894	June 13, 1894	10	
Fray Bentos, Uruguay	June 13, 1894	....do	20	
New Palmira, Uruguay	....do	June 16, 1894	60	
Buenos Ayres Roades, Argentine Republic.	June 16, 1894	June 18, 1894	65	
Ensenada, Argentine Republic	June 18, 1894	June 20, 1894	15	
Colonia, Uruguay	June 20, 1894	.....	20	
Total distance sailed	.....	.....	2,317.5	Cruising report for quarter ending Sept. 30 not received.
Petrel, Lieut. Commander J. H. DAYTON, commanding. Relieved by Lieut. Commander W. H. EMORY, Apr. 10, 1894.	.....	.....	.....	Asiatic Station.
Dutch Harbor, Unalaska	June 29, 1893	July 5, 1893	1,306	
Acherk Harbor, Sannak	July 6, 1893	July 8, 1893	167.1	Temporarily assigned to Bering Sea fleet for duty in connection with seal fisheries.
Caton Harbor, Sannak	July 8, 1893	...do	22.5	
Yukon Harbor, Big Koninshi, Shumagin Islands.	July 10, 1893	July 11, 1893	257.7	
Humboldt Harbor, Popof	July 11, 1893	July 13, 1893	58	
Portage Bay, Alaska	July 13, 1893	....do	20	
Dutch Harbor, Unalaska	July 21, 1893	July 27, 1893	1,018	
Garden Cove, St. George	July 28, 1893	July 29, 1893	194.7	
North Bay, St. Paul	July 29, 1893	July 29, 1893	79.2	
Black Bluffs, St. Paul	July 31, 1893	Aug. 3, 1893	93.3	
North Anchorage, St. George	Aug. 6, 1893	Aug. 8, 1893	202.4	
Black Bluffs, St. Paul	Aug. 14, 1893	Aug. 18, 1893	603.6	
Do	Aug. 21, 1893	Aug. 23, 1893	451.3	
Do	Aug. 26, 1893	Aug. 29, 1893	308.2	
Dutch Harbor, Unalaska	Sept. 1, 1893	Sept. 23, 1893	426.4	
Sitka, Alaska	Sept. 28, 1893	Oct. 3, 1893	1,090.7	Ordered to return to Asiatic Station.
Dutch Harbor, Unalaska	Oct. 8, 1893	Oct. 14, 1893	1,095.3	
Hakodate, Japan	Oct. 26, 1893	Oct. 31, 1893	2,253.1	
Yokohama, Japan	Nov. 3, 1893	Dec. 1, 1893	551.5	
Nagasaki, Japan	Dec. 4, 1893	Jan. 10, 1894	685	
Side Saddle Island, China	Jan. 12, 1894	Jan. 15, 1894	402	
Shanghai, China	Jan. 15, 1894	Feb. 5, 1894	81	
Ningpo, China	Feb. 6, 1894	Feb. 13, 1894	134	
Matsu Island, China	Feb. 14, 1894	Feb. 15, 1894	323	
Pagodo Anchorage, Fuchau, China.	Feb. 15, 1894	Feb. 23, 1894	30	
Amoy, China	Feb. 24, 1894	Mar. 5, 1894	204	
Hongkong, China	Mar. 6, 1894	Mar. 24, 1894	290	
Kaulung, China	Mar. 24, 1894	Mar. 29, 1894	1.7	

FOURTH RATE—Continued.

Name of vessel and ports visited	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Hongkong, China	Mar. 29, 1894		1.7	
Do	Mar. 6, 1894	Apr. 9, 1894		
Francis Island, China	Apr. 12, 1894	Apr. 13, 1894	799	
Woosung, China	Apr. 13, 1894	Apr. 14, 1894	115	
Shanghai China	Apr. 14, 1894	Apr. 24, 1894	12	
Yokohama, Japan	Apr. 28, 1894	May 10, 1894	10.6	Assigned to temporary duty with Bering Sea fleet.
Unalaska, Aleutian Islands	May 22, 1894	May 29, 1894	25.6	
Do	June 6, 1894	June 9, 1894	1,775	
St. Paul, Pribilo. Islands	June 16, 1894	June 18, 1894	516	
St. George, Pribilof Islands	June 18, 1894	June 19, 1894	40	
St. Paul, Pribilof Islands	June 21, 1894	June 22, 1894	105	
Making cruise to Unalaska to July 1.			1 032	
Total distance sailed			16,781.6	Cruising report for quarter ending Sept 30 not received.
Bancroft, Lieut. Commander ASA WALKER, commanding. Relieved by Lieut. Commander R. R. INGERSOLL, June 13, 1894.				Naval Academy practice vessel.
Annapolis		July 9, 1894	127	
Hampton Roads, Va	July 9, 1894	July 10, 1894	13	
Norfolk navy-yard	July 10, 1894	July 12, 1894	13	On practice cruise with naval cadets.
Hampton Roads	July 12, 1894		234	
League Island navy-yard	July 13, 1894	July 14, 1894	5	
Philadelphia, Pa	July 14, 1894	July 19 1894	5	
League Island navy-yard	July 19, 1894	....do	223	
New York navy-yard	July 21, 1894	July 26 1894	145	
Newport, R. I	July 26, 1894	Aug. 1, 1894	367	
Hampton Roads, Va	Aug. 3, 1894	Aug. 3, 1894	128	
Annapolis, Md	Aug. 4, 1894	Aug. 6, 1894	127	
Hampton Roads, Va	Aug. 6, 1894	Aug. 7, 1894	13	
Norfolk navy-yard	Aug. 7, 1894	Aug. 9, 1894	13	
Hampton Roads, Va	Aug. 9, 1894	....do	239	
Philadelphia, Pa	Aug. 10, 1894	Aug. 16, 1894	222	
New York navy-yard	Aug. 17, 1894	Aug. 22, 1894	255	
Hampton Roads, Va	Aug. 23, 1894	Aug. 24, 1894	127	
Annapolis, Md	Aug. 25, 1894	Aug. 27, 1894	11	
Off Thomas Point, Chesapeake Bay.	Aug. 27, 1894	....do	11	
Annapolis, Md	....do	....do	11	
Off Thomas Point, Chesapeake Bay.	....do	Aug. 30, 1894	11	
Annapolis, Md	Aug. 30, 1894			
Total distance sailed			2,300	
Michigan, Lieut. Commander R. M. BERRY, commanding.				
Chicago, Ill	Apr. 30, 1893	Nov. 14, 1893	634	
Detroit, Mich	Nov. 18, 1893	Nov. 21, 1893	176	
Erie, Pa	Nov. 22, 1893	May 8, 1894	169	In winter quarters.
Amherstburg, Ontario, Canada	May 9, 1894			Engaged in surveying Detroit River.
Total distance sailed			979	
Pinta, Lieut. Commander BURWELL, commanding. Relieved by Lieut. Commander A. R. COUDEN, Sept. 26, 1894				Special duty in Alaskan waters.
Sitka, Alaska	June 27, 1893	July 27, 1893	33	
Lindenburg Harbor	July 27, 1893	July 28, 1893	155	
Wrangell Narrows, Prolewy Point.	July 28, 1893	July 29, 1893	105	
Point Deception	July 29, 1893	....do	17	
Fort Wrangell	....do	....do	23	
Point Deception	....do	July 30, 1893	23	
Shakaan Sawmill Anchorage	July 30, 1893	Aug. 2, 1893	50	
Red Bay, upper end	Aug. 2, 1893	....do	34	
Loring	Aug. 3, 1893	Aug. 4, 1893	93	
Ketchikan P. O	Aug. 4, 1893	....do	25	
New Metlakatlan	....do	....do	16	
Fort Wrangell	Aug. 5, 1893	Aug. 5, 1893	103	
Point Alexander, Mitkof Island	....do		10	
Peril Straits, Monthof	Aug. 6, 1893	Aug. 6, 1893	115	

FOURTH RATE—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Killisnoo	Aug. 6, 1893	Aug. 6, 1893	10	
Juneau	Aug. 7, 1893	Aug. 8, 1893	102	
Douglas City, Douglas Island	Aug. 8, 1893	....do	102	
Taiya Inlet	Aug. 9, 1893		100	
Portage Cove, Chilcoot	....do	Aug. 9, 1893	12	
Chilcat Cannery, Pyramid Harbor.	....do	....do	21	
Hoonah Village	....do	Aug. 10, 1893	85	
Glacier Bay	Aug. 10, 1893		27	
Sitka, Alaska	Aug. 11, 1893	Sept. 8, 1893	135	
Leo Anchorage	Sept. 8, 1893	Sept. 9, 1893	26	
Portlock Harbor	Sept. 9, 1893	Sept. 13, 1893	25	
Sitka, Alaska	Sept. 13, 1893		50	
Do	....do	Mar. 25, 1894	27	
Schulze Cove	Mar. 24, 1894	Mar. 25, 1894	191	
Taku Harbor	Mar. 26, 1894	Mar. 27, 1894	26	
Juneau	Mar. 27, 1894	....do	180	
Sitka, Alaska	Mar. 28, 1894			
Do	....do	June 20, 1894	78	
Killisnoo, Alaska	June 20, 1894	June 21, 1894	100	
Juneau, Alaska	June 22, 1894	June 25, 1894	170	
Sitka, Alaska	June 26, 1894	July 8, 1894	105	
Off Point Sullivan	July 9, 1894	July 9, 1894	17	
Point Ellis	....do	....do	65	
Shakaan Sawmill	July 10, 1894	July 10, 1894	12	
Shakaan Bay	....do	....do	43	
Point Barrie	....do	....do	81	
Wrangell	....do	July 11, 1894	105	
Port Chester	July 12, 1894	July 12, 1894	16	
Ketchikan P. O	....do	....do	180	
Hamilton Bay	July 14, 1894	July 14, 1894	188	
Chilkoot	July 15, 1894	July 15, 1894	100	
Hoonah	July 16, 1894	July 16, 1894	90	
Peril Strait, near Ostoia Island	July 17, 1894	July 17, 1894	30	
Sitka	....do	July 30, 1894	17	
Douglas City (Douglas Island)	July 31, 1894	July 31, 1894	2	
Juneau	....do	Aug. 7, 1894	35	
Port Snettisham	Aug. 7, 1894	Aug. 9, 1894	33	
Douglas City	Aug. 9, 1894	....do	108	
Killisnoo	Aug. 10, 1894	Aug. 11, 1894	70	
Sitka	Aug. 11, 1894	Aug. 24, 1894	55	
Lindenburg Harbor	Aug. 24, 1894	Aug. 25, 1894	15	
Killisnoo	Aug. 25, 1894	Aug. 27, 1894	79	
Frederick Sound	Aug. 28, 1894	Aug. 28, 1894		
Brown Cove	....do	Aug. 31, 1894	38	
Cleveland Passage	Aug. 31, 1894	....do	75	
Killisnoo	Sept. 1, 1894	Sept. 1, 1894	70	
Sitka, Alaska	....do			
Total distance sailed			4,063	
Albatross, Lieut. Commander Z. L. TANNER, commanding. Relieved by Lieut. Commander F. J. DRAKE, May 1, 1894.				Temporarily transferred from the U.S. Fish Commission, Apr. 11, 1894, for duty in Bering Sea in connection with the seal fisheries. Arrived at Port Townsend, en route to San Francisco, Oct. 7, 1894.

FREIGHT BOAT.

Fern, Lieut. Commander W. C. GIBSON, commanding. Relieved by Lieut. Commander J. M. HEMPHILL, Nov. 11, 1893.				Engaged in carrying freight between the different yards and stations.
Norfolk, Va		June 30, 1893		
League Island, Pa	July 1, 1893	July 3, 1893	235	
New York	July 4, 1893	July 13, 1893	250	
Newport, R. I	July 14, 1893	July 14, 1893	135	
Boston, Mass	July 16, 1893	July 18, 1893	283	
Portsmouth, N. H	July 18, 1893	July 28, 1893	61	
Boston, Mass	July 28, 1893	July 31, 1893	61	
Vineyard Haven	July 31, 1893	Aug. 1, 1893	115	
Newport, R. I	Aug. 1, 1893	....do	45	
New York	Aug. 2, 1893	Sept. 30, 1893	135	
League Island, Pa	Oct. 1, 1893	Oct. 3, 1893	144	

FREIGHT BOAT—Continued.

Name of vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
Norfolk, Va	Oct. 4, 1893	Oct. 6, 1893	235	Towing lighter for Norfolk navy-yard
Washington, D. C	Oct. 7, 1893	Oct. 21, 1893	175	
Norfolk, Va	Oct. 23, 1893	Oct. 25, 1893	235	
League Island, Pa.	Oct. 26, 1893	Oct. 28, 1893	144	
New York	Oct. 29, 1893	Nov. 2, 1893	224	
League Island	Nov. 3, 1893	Nov. 5, 1893	224	
New York	Nov. 6, 1893	Nov. 10, 1893	224	
Boston, Mass	Nov. 11, 1893	Nov. 15, 1893	291	
Gloucester	Nov. 15, 1893	Nov. 16, 1893	26	
Station for Columbia's trial	Nov. 16, 1893	Nov. 18, 1893	30	Duty in connection with trial of Columbia.
Steaming around buoy, running into and out from under lee of land.	Nov. 16,	17, 18, 1893	50	
Boston	Nov. 18, 1893	Nov. 30, 1893	52	
Vineyard Haven	Nov. 30, 1893	Dec. 1, 1893	115	
Newport, R. I	Dec. 1, 1893	Dec. 2, 1893	45	
New London, Conn	Dec. 2, 1893	Dec. 6, 1893	45	
Station for Marblehead's trial	Dec. 6, 1893	Dec. 7, 1893	23	
New London, Conn	Dec. 7, 1893	Dec. 8, 1893	23	
New York	Dec. 8, 1893	Dec. 14, 1893	102	
Delaware Bay	Dec. 15, 1893	Dec. 15, 1893	148	
Norfolk, Va	Dec. 17, 1893	Dec. 20, 1893	159	
Annapolis, Md	Dec. 21, 1893	Dec. 21, 1893	140	
Washington, D. C	Dec. 22, 1893	Jan. 5, 1894	153	
Norfolk, Va	Jan. 7, 1894	Jan. 10, 1894	174	
Washington, D. C	Jan. 12, 1894	Jan. 20, 1894	174	
Norfolk, Va	Jan. 21, 1894	Jan. 23, 1894	174	
League Island, Pa	Jan. 25, 1894	Jan. 27, 1894	235	
New York	Jan. 28, 1894	Feb. 6, 1894	224	
New London, Conn	Feb. 6, 1894	Feb. 7, 1894	102	
Newport, R. I	Feb. 7, 1894	Feb. 8, 1894	45	
Vineyard Haven	Feb. 8, 1894	Feb. 9, 1894	45	
Provincetown, Mass	Feb. 9, 1894	Feb. 12, 1894	69	
Boston, Mass	Feb. 12, 1894	Feb. 22, 1894	46	
Vineyard Haven	Feb. 22, 1894	Feb. 23, 1894	115	
Newport, R. I	Feb. 23, 1894	Feb. 24, 1894	45	
New York	Feb. 25, 1894	Mar. 3, 1894	135	
Philadelphia, Pa	Mar. 4, 1894	Mar. 5, 1894	232	
League Island, Pa	Mar. 5, 1894	Mar. 6, 1894	8	
New York	Mar. 7, 1894	Mar. 13, 1894	224	
League Island, Pa	Mar. 15, 1894	Mar. 19, 1894	224	
Norfolk, Va	Mar. 21, 1894	Mar. 23, 1894	235	
Washington, D. C	Mar. 24, 1894	Apr. 13, 1894	175	
Annapolis, Md	Apr. 14, 1894	Apr. 15, 1894	153	
Norfolk, Va	Apr. 16, 1894	Apr. 17, 1894	140	
Washington, D. C	Apr. 18, 1894	Apr. 29, 1894	174	
Norfolk, Va	Apr. 30, 1894	May 1, 1894	174	
League Island, Pa	May 2, 1894	May 4, 1894	235	
New York	May 6, 1894	May 16, 1894	224	
Newport, R. I	May 17, 1894	May 17, 1894	135	
Boston, Mass	May 18, 1894	May 22, 1894	159	
Portsmouth, N. H	May 22, 1894	May 26, 1894	61	
Boston, Mass	May 26, 1894	May 30, 1894	61	
Newport, R. I	May 30, 1894	June 1, 1894	159	
New York	June 2, 1894	June 28, 1894	135	
Newport, R. I	June 29, 1894	July 2, 1894	135	
Boston, Mass	July 3, 1894	July 13, 1894	159	
Gloucester, Mass	July 13, 1894	July 14, 1894	26	
Station for Minneapolis's trial	July 14, 1894	....do	18	Duty in connection with trial of Minneapolis.
Boston, Mass	....do	July 19, 1894	44	
Provincetown, Mass	July 19, 1894	July 21, 1894	46	
New York	July 23, 1894		240	
Total distance sailed			9,486	

TORPEDO BOAT.

Cushing, Lieut. F. F. FLETCHER, commanding.				
Newport, R. I., to Coddington Cove and return.		Oct. 7, 1893	10	
Sag Harbor	Oct. 7, 1893		56	
Sag Harbor to Noyack Bay and return.	Oct. 9, 1893		14	

TORPEDO BOAT—Continued.

f vessel and ports visited.	Date of arrival.	Date of departure.	Distance sailed.	Remarks.
			Knots.	
rbor to Noyack Bay and n.	Oct. 10, 1893	.....	14	Engaged in experimental work with Whitehead torpedo.
rbor to Noyack Bay and n (twice).	Oct. 11, 1893	.....	26	
o	Oct. 12, 1893	.....	14	
o	Oct. 13, 189	.....	14	
rbor to Shelter Island and n.	Oct. 16, 1893	.....	24	
rbor to Noyack Bay and (twice).	Oct. 17, 1893	.....	28	
o	Oct. 19, 1893	.....	14	
o	Oct. 20, 1893	Oct. 20, 1893	14	
rt	....do	Oct. 31, 1893	56	
rbor (including runs over ured mile).	Oct. 31, 1893	.....	64	
rbor to Noyack Bay and n.	Nov. 1, 1893	.....	14	
o	Nov. 2, 1893	.....	14	
o	Nov. 3, 1893	.....	14	
o	Nov. 6, 1893	Nov. 7, 1893	14	
ondon	Nov. 7, 1893	Nov. 8, 1893	23	
rt	Nov. 8, 1893	Nov. 9, 1893	43	
rt to Providence and re-	Nov. 9, 1893	.....	43	
rt to Bristol and return	Nov. 10, 1893	Nov. 17, 1893	24	
l	Nov. 17, 1893	Nov. 21, 1893	12	
ort	Nov. 21, 1893	Dec. 6, 1893	12	
ort to Bristol and return	Nov. 22, 1893	.....	44	
ort to outer harbor and rn.	Nov. 27, 1893	.....	4	
ort to New London	Dec. 6, 1893	Dec. 9, 1893	43	
London to New York (navy- d).	Dec. 9, 1893	Dec. 14, 1893	95	
ington, D. C. (navy-yard)	Dec. 18, 1893	.....	428	Winter quarters.
ington to Indian Head and rn.	Apr. 16, 1894	Apr. 16, 1894	42	
Do	Apr. 21, 1894	Apr. 21, 1894	42	
Do	Apr. 23, 1894	Apr. 23, 1894	44	
Do	Apr. 24, 1894	Apr. 24, 1894	44	
Do	Apr. 27, 1894	Apr. 27, 1894	44	Proceeding to Newport via inland passage.
ington, down Potomac er and return.	May 2, 1894	May 2, 1894	35	
Do	May 3, 1894	May 3, 1894	35	
hington	(*)	May 8, 1894	.....	* Reported previously.
-yard, New York	May 10, 1894	May 15, 1894	349	
port, R. I	May 15, 1894	May 30, 1894	136	
port, under way in harbor	May 30, 1894	.....	5	
Harbor, Long Island, New rk.	....do	June 5, 1894	55	Engaged in torpedo work.
Harbor to Noyack Bay and turn.	May 31, 1894	May 31, 1894	12	
Do	June 1, 1894	June 1, 1894	12	
Harbor to Noyack Bay and turn (3 times).	June 2, 1894	June 2, 1894	36	
Harbor to Noyack Bay and turn.	June 4, 1894	June 4, 1894	12	
rport, R. I.	June 5, 1894	.....	65	
er way, Newport harbor.	June 11, 1894	June 11, 1894	5	
Do	....do	....do	5	
Total distance sailed	.....	.....	2,155	Cruising report for quarter ending Sept. 30 not received.

B.

REPORT OF THE SUPERINTENDENT OF THE NAVAL ACADEMY.

U. S. NAVAL ACADEMY,
Annapolis, Md., October 8, 1894.

SIR: I have the honor to submit a report of the operations of the U. S. Naval Academy during the past academic year.

At the annual examination in May, 1894, 34 naval cadets of the line division and 13 of the engineer division completed the four years' course at the Academy and received certificates of proficiency.

At the same examination 31 naval cadets of the line division and 4 of the engineer division, having completed their six years' service as naval cadets, were examined for final graduation. All passed the professional examination and received certificates of graduation; 1 was found physically disqualified for the naval service, and honorably discharged; 2 were honorably discharged at their own request.

The assignments of this class to the several corps of the Navy were as follows:

To the line of the Navy	18
To the Engineer Corps	4
To the Marine Corps	7

Three, for whom there were no vacancies, were honorably discharged, but subsequently, by special authority of Congress, assigned to the Engineer Corps.

At the commencement of the present academic year, October 1, 1894, the numbers in the several classes were:

First class, line division	33
First class, engineer division	12
Second class	47
Third class	70
Fourth class	83
Total	245

The graduation exercises at the close of the first academic year ended on Friday June 8; on Saturday the cadets of the first, third, and fourth classes were embarked on board the practice ship *Monongahela*, and on Monday that vessel sailed on the annual practice cruise.

The cadets of the engineer division of the first class and those of the second class remained at the Academy for practical instruction until July 9, on which day they left Annapolis in the *Bancroft* for practical instruction afloat.

The new boiler house, referred to in my last report, has been completed and is now in satisfactory operation, furnishing an adequate supply of steam for heating purposes and for power to all parts of the Academy.

Two new double houses for officers' quarters will be finished and ready for occupancy about November 15.

The gas plant has been remodeled by repairs to the old benches and additions to and improvements in the purifying rooms. Two new benches are in process of erection, and will be finished by November 1.

Satisfactory progress was made during the academic year in studies and in practical exercises, except that for want of a suitable vessel the autumn drills in seamanship were limited to divisional exercises on board the *Bancroft*.

In this connection I beg to invite attention to the recommendations contained in my correspondence with the Bureau on the subject for the building of two composite ships, each of about 1,000 tons displacement, to be especially designed for use as Naval Academy practice ships. Until such vessels are furnished, the seamanship drills at the Academy and the practice cruisers will not produce satisfactory results. It is recommended that estimates for such vessels be submitted to Congress at the next session, and that the necessity for them be fully presented.

Very respectfully,

R. L. PHYTHIAN,
Commodore, U. S. Navy, Superintendent.

The CHIEF OF BUREAU OF NAVIGATION,
Navy Department, Washington, D. C.

C.

REPORT OF THE COMMANDANT OF THE NAVAL TRAINING STATION.

U. S. NAVAL TRAINING STATION,
Newport, R. I., July 16, 1894.

SIR: During the year ending June 30, 1894, the number of apprentices under training at this station was 888. Of this number there were—

At the station June 30, 1893	309
Received to July 1, 1894	579
Transferred	620
Discharged	80
Deserted	28
At station June 30, 1894	160

Of those received there were—

Enlisted at station, *Richmond*	33
Enlisted at New York, *Minnesota*	336
Enlisted at Philadelphia, *St. Louis*	74
Enlisted at Washington, *Dale*	43
Enlisted at Erie, *Michigan*	14
Enlisted at Boston, *Wabash*	35
Enlisted at Norfolk, *Franklin*	4
Enlisted at Mare Island, *Independence*	1
Received by transfer	35
Received from desertion	4
Total	579

There were transferred from the station to ships:

Portsmouth	277
Wabash	4
Monongahela	190
Essex	107
Vermont	33
Machias	5
San Francisco	1
Kearsarge	1
Baltimore	1
Franklin	1
Total	620

There have been discharged from the service for—

Inaptitude	49
Physical disability	13
Illegal enlistment	1
Under General Order, No. 414	15
Sentence of general court-martial	2
Total	80

Largest number at station December 9, 1893	403
Smallest number at station July 24, 1893	154
Average number (daily) present	286

The system of training described in former reports has been improved by the result of a greater experience, and is concisely set forth in the Routine and Regulations of 1894, printed by the Department, which has in the reports of the inspections of the training ships on their return from their cruises, the best evidence of its success in accomplishing its purpose—the making of fair "ordinary seamen" for the naval service of boys between the ages of 14 and 17 years during the first year of their enlistment.

The physical training of these boys, together with the habits of cleanliness and discipline acquired so early in life at the station, insures a very high average of health and strength to be maintained in the general service.

Effort has been continued to add to the technical training a fondness for a naval life and a respect for the service. Its history, its incidents of peril and dash, and its life on foreign stations, are taught, as before, by lectures. These have been increased in number to 22, illustrated by 574 stereopticon slides. They represent nearly three years of work by Chaplain Holway, and have been printed at the station under his supervision.

An electric arc light is now used with the stereopticon with marked success, making it possible for every ship having an electric plant to illustrate talks to the ship's company by stereopticon slides.

It is found the petty officers and other enlisted men are greatly interested by these lectures, as well as the apprentices, and a trial of an extension of a similar and more expanded system of lectures to the ships of the general service is suggested and recommended. Lectures as a means by which information and amusement may be given to a ship's company have the value and place of books to the officer.

Preliminary training of all enlisted persons would greatly increase the efficiency of every ship's company in the service, and I have to suggest its extension to the engineer's force. This could be readily arranged for at the station, should the matter have the approval of the Department.

The works at the station for which appropriation was made have been finished, and the island has now a channel 6 feet in depth at low water between it and Rhode Island through which runs a tidal current of over a knot an hour. There is no longer a deposit of garbage, etc., poisoning the air as formerly. Below the causeway dredging is now going on.

The boathouse has been repaired, walls have been built, and roads and drains made.

A channel 20 feet in depth has been dredged, and moorings have been placed for the station ship in this channel between the causeway and wharf, as suggested by the Bureau.

The establishment of a scow ferry from the wharf to the ship is contemplated, and estimates for it are in preparation.

Very respectfully,

F. M. BUNCE,
Captain U. S. Navy, Commandant.

The CHIEF OF THE BUREAU OF NAVIGATION,
Navy Department, Washington, D. C.

D.

REPORT OF THE PRESIDENT OF THE WAR COLLEGE AND TORPEDO SCHOOL.

U. S. NAVAL STATION,
Newport, R. I., September 24, 1894.

SIR: I respectfully submit a summary of the work done by the War College during the past year.

I reported for duty as president of the college on the 15th of November, 1893, and through the winter made such progress as was possible in the preparation for the summer course, having the assistance of Commander Stockton. On the 8th of March Junior Lieut. Wilson reported at the War College, and on the 10th of March Ensign Marble, and on the 10th of May Capt. Wallach, U. S. Marine Corps. With the assistance of this staff the detailed preparation of the summer course was completed as fully as the limited time allowed.

On the 12th of June a class reported for duty, consisting of the following members, three of whom were ordered to report a short time in advance of the others:

Commander R. P. Leary, U. S. Navy.
Commander N. Mayo Dyer, U. S. Navy.
Commander G. F. F. Wilde, U. S. Navy.
Commander J. S. Newell, U. S. Navy.
Commander C. J. Train, U. S. Navy.
Commander Geo. E. Ide, U. S. Navy.
Commander Geo. M. Book, U. S. Navy.
Commander Thos. Perry, U. S. Navy.
Commander H. W. Lyon, U. S. Navy.
Lieut.-Commander Wm. Swift, U. S. Navy.
Lieut.-Commander J. V. B. Bleecker, U. S. Navy.
Lieut. W. Kilburn, U. S. Navy.
Lieut. J. J. Hunker, U. S. Navy.
Lieut. J. M. Robinson, U. S. Navy.
Lieut. David Peacock, U. S. Navy.
Lieut. W. R. Rush, U. S. Navy.
Ensign E. A. Anderson, U. S. Navy.
Ensign A. H. Robertson, U. S. Navy.

In addition to the forementioned officers, the following attended the course with the permission of the Department:

Second Lieut. W. E. Reynolds, U. S. Revenue Marine.
Second Lieut. J. L. Sill, U S. Revenue Marine.
Lieut. H. L. Willoughby, Rhode Island naval reserve.
Ensign M. F. Hall, Rhode Island naval reserve.
Ensign H. G. Wilks, Rhode Island naval reserve.
Commander C. G. Flach, Royal Swedish Navy.
Commander Baron Ugglas, Royal Swedish Navy.

During the summer a course of lectures has been delivered by several officers on subjects relating to the study of the art of war. A list of these lectures is inclosed herewith (marked 1). A full abstract of them will be prepared and submitted at an early date; it occupies too much space to appear in this official report. This abstract will also indicate more fully the deductions of greatest importance which have been drawn from these lectures in connection with the war problems, war charts, and war games.

An eloquent address by the Hon. William McAdoo, Assistant Secretary of the Navy, opened the course, and was convincing as to the need of a school of war, where strategy, tactics, and coast defense could be studied and where a thorough course of international law could be pursued. The lectures of Commander Stockton were instructive in

many ways, and especially impressive in a series on the Nicaragua Canal, indicating the effect of such a canal upon the naval policy of this country and upon various questions of strategy and tactics involved. The lectures on the gun by Lieut. Meigs and Prof. Alger, on armor by Lieut. Commander Couden, and on the ram by Commander Harrington were useful in assisting the class in weighing and properly deciding the tactical value of these three elements of warfare; while a very able and instructive series on the torpedo, by Lieut. Holman, concluded with a discussion of torpedo-boat tactics. Two series of lectures by Assistant Naval Constructor Capps, one of which touched upon general construction, and especially upon the ram and the nature and effect of the injuries caused by it, while the other treated of the properties and tactical qualities of ships with reference to their flotation, stability, and turning, were of great interest. Two valuable lectures on electricity were given by Commander Maynard. Capt. Taylor read a series of lectures on naval tactics, whose general deductions were in favor of concentration. Prof. Freeman Snow, whose death I have with great regret announced to the Department, delivered a series of lectures on international law.

These lectures, 22 in number, have been of very great value to the officers. According to the contract with Prof. Snow, his lectures were to be printed, and it is hoped that his literary executors may be able without much delay to prepare his notes for publication as provided for. I inclose herewith (marked 2) a situation in international law, with several minor situations, which were put before the class in connection with Prof. Snow's lectures, and to which many interesting replies were made. It was while he was in the midst of reviewing these replies that the college had the misfortune of losing Prof. Snow's valuable services. Commander Bainbridge-Hoff and Lieut. Niblack delivered a series of lectures on the signal book and signaling, which were valuable in emphasizing the importance that signaling always has in naval tactics. Ten lectures on naval hygiene in peace and in war, five by Medical Director Dean and five by Surgeon Siegfried, were of great practical interest to the class. Passed Assistant Engineer McFarland, in five lectures on naval engines in warfare, contributed largely to a just appreciation of the relative importance of the ship's propulsive power in naval tactics and in the general operations of war. Lieut. Calkins, now stationed in Portland, Oreg., sent, by request of the college, six lectures on coast defense, two of which applied general principles to the solution of the problem proposed for this summer's course. These lectures were read by Capt. Taylor and Commander Stockton. Lieut. Calkins, in my opinion, has shown very rare ability in these lectures. His comprehensive treatment of the subject of coast defense points him out as an officer of great use to the Navy Department in time of war. Capt. Wallach, of the marines, has read lectures on marines in coast defense, hasty intrenchments, combined operations, and the development of infantry tactics, and has treated these important subjects in a most thorough and instructive manner. Maj. Calef, U. S. Army, at the request of the Navy Department, and by permission of the War Department, kindly consented to read five lectures on strategy and military geography. The summing up of the results and deductions from this most interesting course of lectures will, as has been stated, be submitted later to the Department.

A feature of this summer's course that has only once been attempted before is the discussion and solution of war problems. The study of these problems has been of marked advantage. One principal problem was placed before the class at the opening of the course, the conditions

of which were made to simulate as nearly as possible such actual wa fare as is likely to occur on the coast of the United States in the futu A copy of this problem is inclosed (marked 3). The attention and stu voluntarily given to its solution by the experienced officers of the pr ent class is the best proof of the desirability of this method of stu ing the art of war. I will submit later a report on the salient featu of the detailed plans of defense proposed by different officers. Ot war problems, relating to general strategy in cases of foreign wa were put before the class.

Another feature of the course has been the preparation of tact plans for the defense of the principal strategic strongholds of the co These are embodied in the war charts and defense plans of the vari localities. The attention of the class this year has been centered up Narragansett Bay, with reference also to Gardiners and Buzzar Bays. It is believed that these war charts will be of great practic value to the Department, as containing detailed plans of defense bas upon observation and investigation in time of peace, which a co mander-in-chief might need in the sudden emergencies of war. In ad tion to this tangible value, the preparation of these charts is a pra tical study in the art of war.

In connection with both the war problems and the war charts, vis to the localities under discussion have been made by parties of offic of the class and the college staff, in order to correct and complete personal observation the plans based upon study of the charts. Ord authorizing this travel were requested from the Department, and obedience to them reconnoissances have been made, afloat and asho of the waters and coasts of Narragansett Bay, Buzzards Bay, the Vi yard and Nantucket sounds, Fishers Island and Sound, New Lond the Race, Plum Gut, and Gardners Bay and the channels connecti it with the Peconic bays, including the Shinnecock Canal and the se eral islands surrounding that most important strategic outpost on t coast.

Another feature of the course is the war games. These are of th kinds. One, played by two people, representing a duel between t single ships, is based upon Admiral Colomb's game, with several imp tant modifications. The second, or tactical game, is played on a lar board or table, on which two fleets are supposed to engage. This ga is based primarily upon one proposed by Commander McCalla, w modifications suggested by the Austrian and German games and greater practice in playing it. The third, or strategic game, played rules compiled by the college as the result of practice and of study the several foreign naval kriegspiels, represents upon several charts separate rooms the operations covering the whole theater of war. these games the naval duel is regarded almost unanimously by the o cers that have practiced it as of great service in teaching quickness decision in battle. The tactical game with fleets has not been carri so far, but it is already apparent that it is very useful in familiarizi officers with the signal book and fleet evolutions. As to the strateg game there are few dissenting opinions. It may be said to be a mo valuable aid in the study of strategy and strategical geography. think it is not too much for me, as president of the college, to say t the Department that this war game has been useful to a degree fa beyond my most sanguine anticipations.

In August practical instruction in automobile torpedoes was receive by one-third of the class at a time, for periods of about eight days eac By the cordial cooperation of Commander Converse and his assistan this was made a very valuable course of instruction. At Command

Converse's request, the Swedish officers went at a separate time and received more limited instruction.

Throughout this term of nearly four months a valuable course of reading has been prosecuted. A brief synopsis of the more important subjects and authors includes:

International law.—Hall, Wheaton, Snow, Treaties, etc.
Strategy and the art of war.—Jomini, Soady, Mahan, Hamley, Montechant, Colomb.
Naval tactics.—Hoff, Colomb, Parker, Noal.
Coast defense.—Abbott, Clarke, Von Scheliha.
Military and naval history and biography.—Mahan, Tucker, Mundy, Barrow, Clarke, etc.

The desire on the part of the members of the class to read and inform themselves on professional subjects appears to have been notably quickened by the war problems upon which their minds have been concentrated, and this is also true of their interest in the lectures, which, for the same reason, have become very absorbing during this summer's course.

At the close of this course, which has been in some respects experimental, and in which marked innovations have been made and a new system and principle introduced, it seems proper that I should inform the Department of the creditable and officer-like attitude of the present class toward the work of the War College. As the summer has advanced there have been apparent a quickened apprehension and a growing zeal and interest; and it is not too much to say that all this class, composed as it is of officers of mature experience and high standing, are sincerely impressed with the desirability and importance of the study of the art of war. It is to their energetic and cordial assistance that the college owes the marked success that has characterized the summer's work. Lieuts. Reynolds and Sill, of the Revenue Marine, have also been of great assistance, and their work has been a credit to themselves and to their branch of the public service. The officers of the Rhode Island naval reserve who attended the course, especially Lieut. Willoughby, the commander of the Newport division, have also evinced commendable diligence and zeal. With reference to the officers of the Swedish Navy, Commander Flach and Commander the Baron Ugglas, I desire especially to commend them to the Department for the greatest industry in pursuing the course and for exemplary zeal and marked ability in the work.

In conclusion, I beg to say that the results of this summer's course, which are far beyond my most sanguine anticipations, justify me in urging very respectfully upon the Department a continuance of the War College. Its scope need not be increased, but the field in which it works can be more thoroughly and satisfactorily covered if the work be made continuous and the college be recognized by the Department as a permanent institution with a small regular staff. Thereby the inevitable loss which must result from interruption in the work by long intervals of inactivity may be avoided. I therefore recommend that the college be encouraged to proceed through the winter with its regular work, and to this end I respectfully beg that the personnel of the staff of the college, which has already been indicated in my letter of September 11, be approved.

Very respectfully,

H. C. TAYLOR,
Captain, U. S. Navy,
President of Naval War College and Torpedo School.

ASSISTANT SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

SUBJECTS OF LECTURES.

UNE.

Opening address by the Assistant Secretary of the Navy.
Explanation of the course, by the president of the college.
Preparation for war; Formation of charts for war and coast defense; Commerce destroying (2); Sea blockades and investments. Commander Stockton.
Naval tactics (2). Capt. Taylor.
Naval ordnance; The gun in naval warfare. Prof. Alger.
The office of armor. Lieut.-Commander Couden.
Fleet drill book (2). Commander Bainbridge-Hoff.
Army and navy signaling; Signaling in relation to tactics. Lieut. Niblack.
International law (2). Prof. Snow.

JULY.

Comparison of foreign navies; Ramming, with reference to its injuries and their effects. Assistant Naval Constructor Capps.
Combined maritime expeditions (2); The sea power and position of England at the present day; Nicaragua Canal (5). Commander Stockton.
Torpedoes in warfare. Lieut. Holman.
The development of infantry tactics (3); Hasty intrenchments (2). Capt. Wallach U. S. Marine Corps.
Naval tactics (2). Capt. Taylor.
International law (9). Prof. Snow.
Electricity on shipboard (2). Commander Maynard.
The practice of gunnery (5). Lieut. Meigs.
The conditions of ramming—the ram compared with the gun; Forms of ram bows—injuries from ramming and tactical consequences. Commander Harrington.

AUGUST.

The speed and handiness of rams; The gun, torpedo and armor as affecting the rams; Ram manœuvres; The place and office of rams in a fleet. Commander Harrington.
International law (9) including a review of papers on international law questions submitted by officers; Diplomacy—the Monroe doctrine. Prof. Snow.
Naval tactics. Capt. Taylor.
Combined operations (2). Capt. Wallach, U. S. Marine Corps.
Naval hygiene (5). Surg. Siegfried.
The ration and hygiene (3). Medical Director Dean.
Coast defense (3). Lieut. Calkins.
Stability of ships; Metacentric diagrams and curves of stability; Turning trials and steering of ships (2). Assistant Naval Constructor Capps.

SEPTEMBER.

Naval engines (5). Passed Assistant Engineer McFarland.
The ration and hygiene (2). Medical Director Dean.
Land strategy (4); Military geography. Maj. Calef, U. S. Army.
Torpedoes in warfare (4). Lieut. Holman.
Marines in coast defense (2). Capt. Wallach, U. S. Marine Corps.
Coast defense. (2). Lieut. Calkins.

E.

REPORT OF THE HYDROGRAPHER TO THE BUREAU OF NAVIGATION, NAVY DEPARTMENT.

HYDROGRAPHIC OFFICE,
Washington, D. C., October 1, 1894.

SIR: I have the honor to submit the following report of the work of this office for the year ending June 30, 1894:

The detailed reports of the several divisions show a progressive and natural increase in the amount of work executed over that of the past year. The publications of the office show, in certain cases, increased accuracy and artistic effect:

The North Atlantic Pilot Chart has been improved in almost every particular. A base chart had been prepared the previous year, but additions were made during the current year and color has been employed for the land tints. Supplements have been made a special feature. Certain supplements have met with great demand, especially those relating to the practical side of great-circle sailing, the delineation of ice limits over the great banks, and of the lines of equal magnetic variation to every degree of variation.

The cooperation of mariners and others in the collection of data relating to ocean meteorology, to oceanography, etc., has increased in volume. The office now has 3,000 voluntary observers.

The success of the North Atlantic Pilot Chart suggested the publication of a pilot chart of the North Pacific Ocean. Accordingly, such a chart was issued this year. Chambers of commerce of the seaboard cities of the Pacific coast have appealed to Congress for an appropriation of $10,000 to enable the office to continue the publication as a regular monthly issue.

A pilot chart of the Great Lakes has been prepared and issued. In this chart the meteorological features of the other pilot charts have not been included, but it contains much useful information for navigators, and constitutes part of the general scheme to give each interested lakefarer the benefit of the experience gained by all lakefarers and by mariners generally.

Sailing directions are in course of preparation for all the navigable waters of the Great Lakes; that for Lake Superior is now in press and nearly ready for issue. Monthly notices to mariners for the Great Lakes similar to the Notices to Mariners published weekly by the Hydrographic Office for all the navigable waters of the globe are now issued by this office.

On April 26, 1893, the Navy Department, pursuant to a provision of law, directed the establishment of a branch hydrographic office at Chicago. During the current year that office has been installed by Lieut. George P. Blow, U. S. Navy. The Masonic Temple Association of Chicago has granted quarters in the masonic temple, free of cost, to the Chicago branch office, the annual rental for which, if demanded, would be $1,800 per annum. The same association has also erected upon the

building a time ball, the aggregate cost of which it is learned amounted to about $1,400. In return for this courtesy the Masonic Temple Association only demanded from the Government the daily operation of the time ball by the branch hydrographic office. In recognition of the usefulness of the Chicago branch office, the Chamber of Commerce of Cleveland, Ohio, has made efforts, through its Representatives in Congress, to obtain an appropriation for the establishment of a similar office in Cleveland, and promises, in the same manner, rental and the erection of a time ball free of cost to the office. The interest shown in Congress in the case leaves little doubt that there will be favorable action, especially as the Navy Department has expressed its approval.

During the year the office has purchased electrotype copies of practically all of its plates that had not previously been subject to the electrotyping process. Altos were obtained of 78 original plates, aggregating 950,127 square inches, and bassos of 14 original plates, aggregating 12,361 square inches.

Efforts have been made to introduce the card catalogue system throughout all the divisions of the Hydrographic Office wherever it will afford greater convenience than now exists in the methods of keeping the files of the office. The change has already taken place in the division of sailing directions, whereby a number of books for keeping the records has been dispensed with.

In the division of chart supply the time required to provide naval vessels with outfits of charts has been greatly reduced.

Under special charge of the hydrographer, attempts have been made to adopt and present pictorially, for general distribution, a more modern nomenclature for cloud forms, in recognition of the growing importance attaching to clouds as signs for forecasting the weather, especially at sea. Although a great deal of labor has been given to the work and considerable advance made, a conclusion has not been reached. A solution is hoped for during the next year. The nomenclature now in use serves very inadequately any good purpose.

During the year, the office has had the free use of the Ourdan-Kolb letter-engraving machine, pending the action of Congress in the matter of making an appropriation to acquire the right to manufacture the same for the Government. It is fully expected that Congress will appropriate $20,000 for the purpose, that being the amount asked for by the company having the machine in charge. The success of the machine is undoubted. It makes a letter of invariable thickness and of a quality sufficiently good for any hydrographic chart.

The continuation of this report is derived chiefly from the reports of the heads of divisions of the office.

CHART CONSTRUCTION.

The survey of the Detroit River entrance.—By the 1st of May the necessary projections and instructions had been drawn up for the survey of the entrance to Detroit River, from the Detroit River Light-house to Grosse Island and beyond, and since the opening of navigation this survey has been carried on by the officers of the U. S. S. *Michigan*, under the command of Lieut. Commander R. M. Berry, U. S. Navy.

The survey of the west coast of lower California.—Under direction of Lieut. Commander C. T. Hutchins, U. S. Navy, commanding the U. S. S. *Thetis*, the survey of the west coast of lower California has been extended to Boca de las Animas. The work of the season, which is

exceptional in its extent and character, comprises the triangulation and topography of that part of the coast which lies between Pequeña Bay and Boca de las Animas and the development of the hydrography of all that part which lies between Ballenas Bay and Boca de las Animas, with the exception of the soundings to the southeastward of Domingo Point, which were taken during the season of 1892 and 1893 by the officers of the *Thetis*, under the command of Commander George C. Reiter, U. S. Navy.

The records of the work of the past season were received on February 16 and April 25, and since the former date the entire triangulation has been verified and the plotting sheet has been practically completed. The drawing of the coast chart is now about to be commenced.

During the year 72 new nautical charts were completed and published. Sixty-seven of these are engraved on copper and the remaining 5 have been lithographed or transferred to stone from previously published engraved charts.

Twenty-nine chart plates have been improved to an extent which required the redrawing of a large portion of each chart.

There are now 784 engraved plates available for the printing of nautical charts for the use of the Navy and the mercantile marine.

The number of copies of charts printed during the fiscal year and issued to the maritime public and to meet the requirements of the Government, exclusive of those printed to illustrate books and to accompany Notices to Mariners, is 92,979.

Charts engraved on copper and published during the fiscal year ending June 30, 1894.

General locality.	Catalogue number.	Title.	Scale.
Japan	1300	The coasts of Japan, from Sado Island to the Gulf of Tokyo, including Tsugaru Strait.	D. long. = 4.5
Do	1376	Shimonoseki Strait	M = 2.0
West Indies	1382	Port Arecibo, Puerto Rico	M = 3.0
Hawaiian Islands	1381	Honolulu Harbor	330 ft. = 1.0
Korea	1383	Approaches to Chemulpho	M = 1.0
United States of Colombia	1384	Chiriqui Lagoon and Almirante Bay	M = 1.0
Ecuador	1391	Approaches to Guayaquil	M = 0.5
		Plan of port and city of Guayaquil	M = 3.0
Peru	1387	Talara Bay	1,000 yds. = 5.0
Canada (British Columbia)	1386	Uchucklesit Harbor, Barclay Sound	M = 3.0
		Island Harbor, Barclay Sound	M = 6.0
Do	1388	Hesquiat Harbor	M = 1.5
		Refuge Cove	M = 1.5
Do	1389	Shoal Channel, Howe Sound	M = 3.0
		Rumper Cove and Port Graves, Howe Sound	M = 3.0
Do	1395	Nanoose Harbor, Vancouver Island	M = 3.0
Do	1390	Pender Harbor	M = 3.0
		Tucker Bay, Lasqueti Island	M = 2.0
		Buccaneer Bay	M = 3.0
Do	1394	Drew Island, Valdes islands	M = 3.0
		George Harbor, Cortes Island	M = 3.0
		Prideaux Haven, Hemeroy Channel	M = 4.0
		Walsh Cove, Hedona Island	M = 4.0
		Squirrel Cove, Cortes Island	M = 3.0
		Tribune Bay, Hornby Island	M = 2.0
Do	1392	Becher and Pedder bays	M = 4.0
Do	1393	Blunden Harbor	M = 6.0
		Cullen Harbor, Broughton Island	M = 6.0
		Farewell Harbor, Swanson Island	M = 3.0
		Sunday Harbor, Crib Island	M = 3.0
		Dusky Cove, Bonwick Island	M = 3.0
Do	1398	Port Harvey, Johnstone Strait	M = 3.0
Do	1399	Port Augusta	M = 3.0
North Atlantic Ocean	1400	Pilot Chart of the North Atlantic Ocean	1 long. = 0.275
Do	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for March.	1 long. = 0.275
Do	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for April.	1 long. = 0.275

Charts engraved on copper and published during the fiscal year, etc.—Continued.

General locality.	Catalogue number.	Title.	Scale.
North Atlantic Ocean	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for May.	1 long. = 0.275
Do	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for June.	1 long. = 0.275
Do	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for July.	1 long. = 0.275
Do	1400	The invariable data comprising the forecast shown on the Pilot Chart of the North Atlantic for August.	1 long. = 0.275
Do	1401	Pilot Chart of the North Pacific Ocean	1 long. = 0.2
Brazil	1402	East Coast of Brazil from Rio de Janeiro to Santos.	M = 0.25
United States of Colombia	1405	Colombia Bay, Gulf of Darien	M = 2.0
Do	1406	Mandinga Harbor, Gulf of San Blas	M = 2.0
Do	1407	Chiri Chiri Bay	M = 4.0
Canada (British Columbia)	1408	Vancouver Harbor, Burrard Inlet	M = 4.0
West Indies	1409	Frederiksted Road, West Coast of Saint Croix Island.	M = 6.0
United States of Columbia	1410	San Miguel Bay and Darien Harbor, with the Savannah and Tuyra rivers. With plans, continuation of Tuyra River, and Boca Chica.	M = 3.0
North Atlantic	1411	Atlantic Coast, from Halifax to Key West, including the Bahamas and the Greater Antilles.	D. long = 1.3
Canada (British Columbia)	1396	Tracey Harbor, vicinity of Queen Charlotte Sound, British Columbia.	M = 6.0
Do	1397	Cypress Harbor, vicinity of Queen Charlotte Sound, British Columbia.	M = 6.0
Do	1403	Waddington Harbor, head of Bute Inlet, British Columbia.	M = 2.0
Do	1404	Beaver Creek	M = 3.0
		Cameleon Harbor	M = 3.0
		Otter Cove	M = 3.0
Do	1414	Quatsino Sound, Vancouver Island, British Columbia.	M = 2.0
Do	1416	Port Neville, Johnstone Strait, British Columbia	M = 4.0
		Plan of Forward Harbor, Wellbore Channel	M = 4.0
Cuba	1417	Port Matanzas	M = 4.0
Canada (British Columbia)	1418	Seymour Narrows, Discovery Passage	M = 2.0
United States and Canada	1415	Pilot Chart of the Great Lakes	D. lat. = 3.4
Chile	1421	Curanipe Road	M = 8.0
Do	1422	Buchupureo Road	M = 4.0
Michigan	1424	Eagle Harbor, Michigan	212 yds. = 1.0
Do	1425	Grand Marais Harbor	1,500 ft. = 1.0
Minnesota	1426	.....do	133 yds. = 1.0
Canada (British Columbia)	1419	Sooke Inlet, Vancouver Island	M = 4.0
		Plan Port San Juan, Vancouver Island	M = 2.0
China Sea	1428	Singapore New Harbor	M = 6.0
West Indies	1423	Saint Croix Island	M = 1.0
Canada (British Columbia)	1427	Nasparti and Ououkinsh inlets, West Coast Vancouver Island.	M = 1.5
Brazil	1429	Port Victoria and Espiritu Santo Bay	M = 4.0
Canada (British Columbia)	1430	Esperanza and Nuchalitz inlets	M = 2.0
		Plan of Queens Cove, Esperanza Inlet	1,000 yds. = 6.0
Do	1431	Beaver Harbor and Alert Bay	M = 8.0
		Entrance to Nimkish River	M = 3.0
Do	1433	Suquash Anchorage, Queen Charlotte Sound	M = 6.0
		Beaver Cove, Broughton Strait	M = 3.0
Do	1438	Oyster and Telegraph harbors	M = 3.0
		Plans of Osborn Bay	M = 3.0
		Maple Bay	M = 3.0
West Indies	C	Index to coast, special, and harbor charts	1 long. = 0.4
Canada	B	.....do	D. long. = 0.76.
Lake Superior	1424	Eagle Harbor	212 yds. = 1 inch.
Lake Superior (Michigan)	1425	Grand Marais Harbor	500 yds. = 1 inch.
Do.....(Minnesota)	1426	.....do	133 yds. = 1 inch.
Lake Michigan (Wisconsin).	1434	Eastern Entrance to Sturgeon Bay Canal	90 yds. = 1 inch.
Lake Michigan	1435	Milwaukee Harbor of Refuge	1,350 yds. = 1 inch.
St. Marys River	1436	Hay Lake Channel	
Lake Michigan (Wisconsin).	1441	Entrance to Milwaukee River	110 yds. = 1 inch.

Charts lithographed and published during the fiscal year ending June 30, 1894.

Title.	Scale.	Number of copies.	Remarks.
Pilot Chart of the North Atlantic.	D. long. = 0.27	49,600	Issued monthly in cooperation with the division of marine meteorology.
Storm of Aug. 23-28, 1893, inclusive, along the Atlantic coast of the United States.	.....	4,400	Illustrated by six synoptic charts upon one sheet and furnished as a supplement to the Pilot Chart of the North Atlantic Ocean for November, 1893.
Pilot Chart of the North Pacific Ocean.	D. long. = 0.2	5,000	Issued for January and July, 1894.
Pilot Chart of the Great Lakes.	D. long. = 2.4	2,300	Showing all railroad connections; lights, and life saving stations along the shores of the Great Lakes, and containing a small chart showing canals of the St. Lawrence River; a table showing length, number, and dimensions of locks, etc.; of canals connecting with the Great Lakes, explanatory text in regard to "The compass error," "Rules for the use of oil to protect vessels in stormy waters" (with illustrations), a list of U. S. Weather Bureau stations, displaying storm, cautionary, and information signals, with illustrations and explanation of the flags employed, also illustrations and explanation of the "Canadian storm signals."
Hydrographic Office Chart No. 1385. Variation Chart of the North Atlantic Ocean.	D. long. = 0.27	2,650	Showing lines of equal variation from degree to degree for the year 1893.
Plotting sheet of the Pilot Chart of the North Atlantic Ocean.	D. long. = 0.2	500	For use in the division of marine meteorology.
Plotting sheet of the Pilot Chart of the North Pacific Ocean.	D. long. = 0.2	500	Do.
Great Circle Sailing Chart...	.....	1,000	Illustrated by a diagram of the Western Hemisphere, showing great circles, rhombs, and composite tracks between Cape Flattery and Yokohama, and between San Francisco and San Bernardino Strait, with text explaining the advantages of great circle sailing.
Edition of Hydrographic Office, No. 1262, Chart of the World, showing tracks between the principal ports for full-powered steam vessels, with distances in nautical miles.	D. long. = 0.12	2,300	There are also tables on the chart giving distances between the important places of China and the East, the west coasts of North and South America, and the West Indies. This chart was originally published in June, 1891.
Track Charter of the U. S. Naval Force in Bering Sea, Commander Nicoll Ludlow, U. S. Navy, commanding, 1893.	.....	.....	Showing in colors the tracks of the U. S. S. *Mohican*, *Ranger*, and *Petrel*; of the U. S. F. C. *Albatross*, and of the U. S. R. C. *Corwin* and *Rush*, and the distances cruised by each vessel in patrolling Bering Sea in 1893.
Western Sheet.....	D. long. = 1.2	100	
Eastern Sheet	D. long. = 1.2	100	
Special edition of the Pilot Chart of the North Atlantic Ocean for March, 1894.	D. long. = 0.27	1,200	For Hydrographic Office publication No. 107, wrecks and derelicts in the North Atlantic Ocean, 1887 to 1893, inclusive, the Wreck Chart showing dangerous wrecks, derelicts reported but once, and drift tracks of derelicts.
Wreck Chart of the North Atlantic Coast of America.			
Diagrams of gun practice of the U. S. Navy during the first quarter, 1893.	(*)	350	Comprised 65 reports of practice.
Diagrams of gun practice of the U. S. Navy during the second quarter, 1893.	(*)	350	Comprised 99 reports of practice.
Diagrams of gun practice of the U. S. Navy during the third quarter, 1893.	(*)	250	Comprised 91 reports of practice.
Diagrams of gun practice of the U. S. Navy during the fourth quarter, 1893.	(*)	250	Comprised 33 reports of practice.
Index Charts A, X, B, C, F, R, H, I, S, and T.	Various scales..	1,000	
Index Charts N, O, P.	.....do.....	2,000	

*Scale of target, three-fourths inch = 10 feet.

Charts lithographed and published during the fiscal year ending June 30, 1894—Cont'd.

Title.	Scale.	Number of copies.	Remarks.
Index Chart A as an index of Index Charts, showing by red lines the limits of all the Index Charts.	.....	.....	Printed for the catalogue of Hydrographic Office charts.
Two Index Charts of the West Coast of Africa.	.....	350	Printed for the Sailing Directions for the West coast of Africa.
Hydrographic Office No. 1424, Eagle Harbor, Michigan, Lake Superior.	212 yds. = 1.0	650	For the Sailing Directions for the Great Lakes.
Hydrographic Office No. 1425, Grand Marais Harbor, Michigan, Lake Superior.	500 yds. = 1.0	650	Do.
Hydrographic Office No. 1426, Grand Marais Harbor, Minnesota, Lake Superior.	133 yds. = 1.0	650	Do.
Current Chart of Lake Superior.	D. lat. = 1.75	650	Do.
Mist Harbor, Shumagin Islands, Alaska.	500 yds. = 3.0	1,300	Published in Notices to Mariners, No. 31, 1893.
Sandy Cove, Shumagin Island, Alaska.	M = 3.0	1,300	Do.
Koh Kram Bay, Gulf of Siam, Asia.	350 yds. = 3.0	1,300	Published in Notices to Mariners, No. 30, 1893.
Hutchins Bank, West Coast of Lower California.	M = 1.0	1,300	Published in Notices to Mariners, No. 47, 1893.
Albatross Anchorage, Portage Bay, Alaska.	450 yds. = 1.0	1,300	Published in Notices to Mariners, No. 48, 1893.
Moore Bank, West Coast of Lower California.	M = 1.75	1,300	Published in Notices to Mariners, No. 3, 1894.
Hydrographic Office Chart No. 1413, Saracen Bay, Rong Sam Lem Island, Siam.	M = 1.5	1,300	Published in Notices to Mariners, No. 6, 1894.
Weather Signal Flags, French Settlement, Shanghai, China.	.....	1,300	Published in Notices to Mariners, No. 7, 1894.
Local Weather Signal Flags, Nagasaki, Japan.	.....	1,300	Do.
Chernofski Harbor, Unalaska Island, Alaska.	M = 2.0	1,300	Published in Notices to Mariners, No. 11, 1894.
Illustration of an Automatic Tidal Indicator, Fort Hamilton Wharf, New York Harbor.	.....	1,300	Published in Notices to Mariners, No. 13, 1894.
View of Light-House, Sapienza Island, Greece.	.....	1,300	Published in Notices to Mariners, No. 15, 1894.
Shoal near York Spit Buoy (mouth of York River, Virginia).	.....	1,300	Published in Notices to Mariners, No. 20, 1894.

NOTE.—In the preceding tables the scale of the chart is expressed in inches by the use of the abbreviations D. long., the length of a degree of longitude on the equator; D. lat., the length of a degree of the meridian in the middle latitude of the chart; and M, the length of a nautical mile.

DIVISION OF SUPPLY.

There are 931 hydrographic charts on issue; an increase of 22 for the year. Fifty-eight new charts, of which 3 are index charts, have been received from the division of chart construction. Thirty-six charts have been canceled, of which 11 are old engraved charts and 25 are photolithographs. One hundred and seventy photolithographs are still on issue.

The South Atlantic Station Catalogue and the General Catalogue of Hydrographic Office Publications have been completed and placed on issue.

The sale of charts by agents during the fiscal year amounts to $3,699.42; a decrease of $439.72 from that of the preceding one. The decrease is due chiefly to the prevailing business depression.

The following table exhibits the receipts and expenditures of Hydrographic Office and Coast Survey charts:

	Total for the year.	
	Hydrographic Office.	Coast Survey.
Copies of charts received from—		
Division of chart construction	28,698	.....
Division of chart construction (lithographic)	4,980	.....
Division of chart construction (for catalogues)	16,014	.....
U. S. Coast and Geodetic Survey	.....	4,536
United States ships	557	153
Total	50,249	4,689
Copies of charts issued to—		
United States ships	7,403	4,018
Agents, for sale	9,338	.....
Archives, division of sailing directions	387	176
Office use	624	32
Branch hydrographic offices	4,182	200
Coast and Geodetic Survey	643	.....
Home correspondents	343	.....
Foreign hydrographers	193	.....
Miscellaneous	1,284	262
For catalogues	16,014	.....
Total	40,411	4,688
Charts published	58	.....
Charts canceled	36	.....
Plans canceled	2	.....
Copies of charts condemned	1,113	398
Copies of canceled charts condemned	3,182	.....

Hand corrections made on Hydrographic Office and Coast Survey charts.

	Hydrographic Office.	Coast Survey.
Number of standards corrected	584	842
Number of charts corrected from notices	2,021	5,767
Number of charts corrected from other sources	14,313	.....

DIVISION OF ISSUE.

During the fiscal year the following vessels were supplied with outfits of charts: The *Baltimore*, for the Asiatic Station; the *Bennington*, for the European and Pacific Stations, the former outfit having been returned on board the *Lancaster* from Gibraltar; the *Detroit*, *Machias*, *New York*, *Atlanta*, *Columbia*, *Raleigh*, *Cincinnati*, and *Montgomery*, for the North Atlantic Station. On going out of commission for repairs the *Machias* transferred her outfit to the *Marblehead*. The *Monongahela* transferred her outfit to the *Essex* and received a special outfit adapted to her cruise with the cadets from the Naval Academy. The *Alert* received the Pacific Station outfit kept ready for issue at the branch hydrographic office, San Francisco, and the same has been replaced from the main office. Special South Atlantic Station outfits were supplied to the *New York*, *San Francisco*, and *Miantonomoh* during the Brazilian revolution. The *Constellation* was furnished with the charts required for her cruise from Norfolk, Va., to Newport, R. I. The *Michigan* was supplied with a complete set of charts of the Great Lakes. The U. S. revenue cutter *Grant* was furnished with a set of charts of Magellan Straits.

The following table exhibits the receipts and expenditures of charts from the British Admiralty section:

CHARTS RECEIVED.

British Admiralty charts:		
From J. D. Potter, Admiralty agent, London, England		6,814
From United States vessels, returned outfits		739
From B. F. Stevens, U. S. dispatch agent, London, England, as follows:		
Sent to this office		36
Sent to United States vessels		528
From British Admiralty office (complimentaries)		181
From other sources		24
Total British Admiralty charts received		8,322
Hydrographic Office charts:		
From Hydrographic Office section		7,403
Coast Survey charts:		
From Hydrographic Office section		4,018
Sent to United States ships by Coast Survey Office		851
Total number of charts received from all sources		20,594

CHARTS ISSUED.

British Admiralty charts:		
To United States vessels, from this office		5,002
To United States vessels, from B. F. Stevens		528
To archives		512
To other divisions		71
Total British Admiralty charts issued		6,113
Hydrographic Office charts:		
To United States vessels		7,403
Coast Survey charts:		
To United States vessels		4,869
Total number of charts issued		18,385
British Admiralty charts on hand July 1, 1893	11,605	
British Admiralty charts received for one year	8,322	
		19,927
British Admiralty charts issued for the year	6,113	
British Admiralty charts condemned during the year	1,169	
		7,282
British Admiralty charts remaining on hand June 30, 1894		12,645

Hand corrections made on British Admiralty charts.

Number of standards corrected	943
Number of charts corrected from notices	3,957
Number of charts corrected from other sources	3,800

Twenty-six new British Admiralty charts have been received and placed on issue, 10 have been reissued, and 12 have been canceled. The total number of British Admiralty charts now issued to the United States ships by this office is 2,069.

DIVISION OF SAILING DIRECTIONS.

ARCHIVES.

Documents.—During the past year there have been received, indexed and catalogued, and placed in the archives on the shelves for reference 570 documents, 244 books, and 336 pamphlets.

Charts.—Many charts have been received, registered, delivered on requisition, and rearranged; 3,161 copies of charts affected by Notices to Mariners have had reference marks made on them; 15 sets of index charts and 23 catalogues have been compared and kept correct to date,

and the division has been kept supplied with the latest charts as fast as published.

For various reasons and purposes about 7,800 charts were handled during the year. The number of charts issued to the United States vessels of war, and therefore subject to correction when affected by Hydrographic Office Notices to Mariners, is as follows:

British Admiralty	2,041
U. S. Hydrographic Office	388
U. S. Coast and Geodetic Survey	176
Total	2,605

Summary of new and corrected charts received and of old ones condemned by cancellation.

	Received.	Condemned.		Received.	Condemned.
British Admiralty	694	524	Russian	51	34
Brazilian	2	1	Spanish	54	33
Canadian	1	.....	Swedish	30	33
Chilean	1	.....	Uruguay	1	.....
Danish	1	.....	U. S. Coast and Geodetic Survey	176	176
Dutch	49	27	U. S. Hydrographic Office	388	.....
French	63	94	U. S. Engineers	73	67
German	16	3			
Italian	59	18			
Japanese	65	23	Total since June 30, 1893	1,726	1,033
Noris & Wilson, England	2	.....			

In addition to the above, 1,500 slips cut from Notices to Mariners have been pasted in the Sailing Directions and 2 charts have been prepared for the division of chart construction. New indexes have been prepared. Light Lists I, II, and III have been corrected, and several foreign works have been translated in connection with the charts.

Notices to Mariners.—One thousand one hundred and eighty-five announcements of importance to navigation, an increase of 99 over last year, were published in the usual form of Notices to Mariners, which were issued promptly on Saturday of each week and the circulation of which, together with the extracts, amounted to 853,590.

The foreign Notices to Mariners and reports received have been translated, and the more important information derived therefrom republished as usual. A large amount of original matter from the reports received from United States vessels of war, United States consuls, and our correspondents in the merchant marine of various nationalities has also been published.

The index to the Notices to Mariners for 1893 was made up for the printer as usual in time to have it issued with the first notice for 1894, and was received from the printer January 25.

Volumes IV and V of the List of Lights are still in course of revision and preparation for publication in one volume as Volume IV, in the new form adopted for Volumes I and III. Quite recently, June 22, the revision of Volume II has been commenced and the new edition of the volume will soon be ready for the press.

SAILING DIRECTIONS AND PUBLICATIONS.

During the year the following publications have been prepared and placed on issue:

H. O. No. 104. Anchorages, Atlantic and Gulf coasts of the United States.
H. O. No. 9. American Practical Navigator, edition of 1893.
H. O. No. 13. Useful Tables, Bowditch, edition of 1893.
H. O. No. 71. Azimuth Tables, edition of 1893.
H. O. No. 105. The West Coast of Africa.

H. O. No. 106. Azimuth Tables for the Great Lakes.
H. O. No. 107. Wrecks and Derelicts in the North Atlantic Ocean, 1887 to 1893, inclusive.
Hydrographic Office Catalogue of Charts, Plans, Sailing Directions, and other publications, 1893.
Annual Report of the Hydrographer to the Bureau of Navigation for the fiscal year ending June 30, 1894.

Supplements to the following sailing directions were prepared and placed on issue, as also were sheet corrections for various sailing directions other than those published by this office:

H. O. No. 34. English Channel, Part I, third edition.
H. O. No. 35. English Channel, Part II, third edition.
H. O. No. 89. The West Coast of South America, third edition.
H. O. No. 96. The Coast of British Columbia, second edition.
H. O. No. 86. Caribbean Sea and Gulf of Mexico, Vol. I.
H. O. No. 99. Nova Scotia and Bay of Fundy. (Prepared, printed, and in the hands of the printer being bound.)
H. O. No. 87. The International Code of Signals, edition of 1894.
H. O. No. 88. The East Coast of South America, second edition. (Prepared and in the hands of the printer.)
H. O. No. 85. Indian Ocean, revised supplement.

The following were prepared, kept corrected to date, and are now ready for the press:

H. O. No. 108, Part I. Lake Superior.
H. O. No. 108, Part II. Lake Michigan.
H. O. No. 108, Part III. Lake Huron.
H. O. No. 108, Part III. Supplement. Georgian Bay and North Channel.
H. O. No. 109, Contributions to Terrestrial Magnetism; The Variation of the Compass.
A new edition of the List of Lights of the World in four volumes.
Supplement to Northwest and West Coast of Spain and Coast of Portugal. H. O. No. 52.
Supplement to Caribbean Sea and Gulf of Mexico, Vol. II. H. O. No. 64.
Supplement to Gulf and River St. Lawrence and Cape Breton Island. H. O. No. 100.

The following new publications were received and put on issue:

From the U. S. Coast and Geodetic Survey:
U. S. Coast Pilot, Part III. From Cape Ann to Point Judith.
U. S. Coast Pilot, Part V. From New York Bay to Chesapeake Bay Entrance.
Tide Tables, Atlantic Coast, 1895.
Notices to Mariners.
Catalogue of Charts, Plans and Sailing Directions.
From the U. S. Light-House Board:
Beacons, Buoys, and Daymarks for the various districts
Light List, Atlantic Coast, 1894.
Light List, Pacific Coast, 1894.
Notices to Mariners.
Light-House Board bulletins.
From the U. S. Treasury Department:
List of Merchant Vessels, 1893.
From the U. S. Nautical Almanac Office:
Ephemeris and Nautical Almanac, 1895.
Nautical Almanac, 1895.
From the British Admiralty (purchased):
Pacific Islands, Part II, of Vol. I, 1893.
Dardanelles, Sea of Marmora, Bosporus, and Black Sea, 1893.
Eastern Archipelago, Part II (western part), 1893.
Coast of Ireland Pilot, 1893.
Admiralty Light List No. 1, British Islands, 1894.
Admiralty Light List No. 2, the North, Baltic, and White Seas, 1894.
Admiralty Light List No. 3, West Coast of Europe, 1894.
Tide Tables, British and Irish Ports, 1894.
Admiralty Catalogue of Charts, Plans, etc., 1894.
Supplement to Eastern Archipelago, Part I, 1893.
Hydrographic Notice No. 1 of 1894, relating to the Pacific Islands, Part II, Vol. I.
From B. F. Stevens, London (sent directly to ships on foreign stations):
Pacific Islands, Part II of Vol. I, 1893.
Tide Tables, British and Irish Ports, 1894.
Dardanelles, Sea of Marmora, Bosporus and Black Sea, 1893.

Eastern Archipelago, Part II (western part), 1893.
Admiralty Light List No. 1, the British Islands, 1894.
Admiralty Light List No. 2, the North, Baltic, and White Seas, 1894.
Admiralty Light List No. 3, the West Coast of Europe, 1894.
Supplement to Eastern Archipelago, Part I, 1893.
Coast of Ireland Pilot, 1893.
Hydrographic Notice, No. 1, of 1894, relating to Pacific Islands, Part II of Vol. I.

The following publications were withdrawn from issue, being canceled by later editions placed on issue during the year:

H. O. No. 46 and Supplement. West Coast of Africa, Vol. I.
H. O. No. 47 and Supplement. West Coast of Africa, Vol. II.
H. O. No. 48 and Supplement. West Coast of Africa, Vol. III.
Supplement to H. O. No. 34. English Channel, Part I, second edition.
Supplement to H. O. No. 35. English Channel, Part II, second edition.
Supplement to H. O. No. 89. West Coast of South America, second edition.
Supplement to H. O. No. 96. Coast of British Columbia, first edition.
Atlantic Local Coast Pilot, subdivisions 6 and 7.
Atlantic Local Coast Pilot, subdivision 13.
Atlantic Local Coast Pilot, subdivision 14.
Atlantic Local Coast Pilot, subdivision 15.
Tide Tables, Atlantic Coast, 1893.
Tide Tables, Pacific Coast, 1893.
List of Beacons, Buoys, and Daymarks of the various districts, 1893.
Light List (L. H. B.). Atlantic Coast, 1893.
Light List (L. H. B.). Pacific Coast, 1893.
List of Merchant Vessels, 1892.
Tide Tables, British and Irish Ports, 1893.
Admiralty Light List No. 1, British Islands, 1893.
Admiralty Light List No. 2, the North, Baltic, and White Seas, 1893.
Admiralty Light List No. 3, West Coast of Europe, 1893.
Dardanelles, Sea of Marmora and the Bosporus, 1892, and Hydrographic Notice No. 4 of 1887.
Black Sea Pilot, 1884, and supplement.
Coast of Ireland Pilot, Part I, 1885, and Hydrographic Notice No. 8 of 1888.
Coast of Ireland Pilot, Part II, 1887, and Hydrographic Notice No. 7 of 1889.

During the year 454 copies of sailing directions and 74 copies of light lists have been corrected and brought up to date to supply the places of corrected copies of these publications issued to vessels and branch offices.

VESSELS FITTED OUT.

The following were supplied with outfits of sailing directions and nautical books from this division:

Name of ship.	Outfit furnished.	Remarks.
Baltimore	Asiatic	Regular outfit for cruising.
Bennington	European and South Atlantic	Do.
Machias	North and South Atlantic	Do.
Detroit	do	Do.
New York	do	Do.
Revenue cutter Grant	Special Pacific	For making passage to the Pacific coast.
Miantonomoh	South Atlantic	To complete original outfit.
Bennington	Pacific	Regular outfit for cruising.
Castine	Special North Atlantic	For making passage Portsmouth to Norfolk.
Alert	Pacific station	Regular outfit for cruising.
Atlanta	North and South Atlantic	Do.
St. Marys	North Atlantic and European	Practice cruise of school ship.
Michigan	Special lake	Regular outfit for cruising.
Columbia	North and South Atlantic	Do.
Raleigh	do	Do.
Monongahela	Special North Atlantic	Practice cruise of cadets.
Cincinnati	North and South Atlantic	Regular outfit for cruising.
Montgomery	do	Do.
Branch office, Cleveland, Ohio	Complete set of all books issued by the Hydrographic Office.	For reference in branch office.
Marblehead	North and South Atlantic	Transferred from the Machias.

SUMMARY.

The following is a statement in regard to publications received and issued by the division during the fiscal year:

Quarter.	Received.	Issued.	Condemned.
First	1,484	1,532	346
Second	3,026	1,633	459
Third	1,199	1,097	942
Fourth	1,844	2,191	541
Total	7,553	6 453	2,288

Total for the fiscal year ending June 30, 1893, 6,065 received; 3,931 issued.

Thirty-three British Admiralty publications were sent direct to ships in commission by Mr. B. F. Stevens, U. S. dispatch agent, London.

In the summary given are included the (541) British Admiralty publications bought during the year and also those (475) issued to vessels and branch offices.

MARINE METEOROLOGY.

The North Atlantic Pilot Chart has been decidedly improved in almost every particular. Most of these improvements were embodied in the January Pilot Chart. Rather more than the usual number of supplements of practical and timely interest to mariners have been published with the charts, such as illustrated articles on the principles of great-circle sailing; tables showing the difference between the true and the apparent direction and force of the wind observed on board ship at various speeds, etc.; articles on the subject of magnetic variation; a subchart and description of the severe storm of March 23, 1894; articles on the use of oil, the destruction and removal of derelicts, especially the work of the vessels of the U. S. Navy in this connection; and charts showing the limit of ice on the Grand Banks for a period of seven years, which charts serve as a forecast of the region where ice may be expected in the month subsequent to the dates of publication.

In November a supplement to the Pilot Chart was published, giving full details of the progressive movement of two cyclones in August, 1893. This supplement consisted of a series of six small charts illustrating the consecutive changes in the weather conditions, and forming a valuable and instructive contribution to the science of ocean meteorology.

The Weekly Hydrographic Bulletin has been increasing in value and importance to coastwise commerce. The demand for these bulletins has necessitated enlarging the edition by 200 copies, the edition now being 2,100. These bulletins contain valuable and timely information concerning dangerous obstructions to navigation and reports of ice.

The subject of wrecks and derelicts and the importance of the removal of these menaces to navigation has been constantly emphasized in the Pilot Chart and Weekly Bulletin, and in connection with the effort to secure international cooperation in the work, full statistics concerning these derelicts were prepared in this division and published in Hydrographic Office publication No. 107.

The division has also been assigned the work of preparing monthly *Notices to* Mariners for the Great Lakes, and, in connection with the

branch hydrographic office at Chicago, efforts have been made to provide lake mariners with the practical meteorological and nautical experience of this office.

Blank forms for reports by cooperating mariners on the Great Lakes have been prepared and issued, and it is confidently expected that this cooperation will result in obviating much loss of life and property on the lakes, by introducing the use of oil and giving clear instructions in nautical practice, which has proved to be of such great benefit to mariners on the high seas.

Reports of marine meteorology have been regularly received from voluntary observers in mercantile vessels and vessels of war of all nationalities; keepers of life-saving stations; observers in the West Indies and other islands, and from corresponding meteorological observatories in all parts of the world.

The number of observers afloat has steadily increased and the character of their reports has been gradually improved, by calling their attention to any inaccuracy or lack of data, by the systematic comparison and office records of their barometers, and by circular letters inclosed with the invariable acknowledgement of each and every report.

Questions relating to meteorology and navigation have frequently been asked and answered. Some of these questions by foreign officials, admiralty lawyers, and observers relating to weather conditions at certain dates and localities on the ocean, to abnormal currents, fog, ice, particulars about wrecks and derelicts, etc., have required a great deal of time and labor to answer.

The number of observers afloat has increased to 3,207, but all of these are not constantly sending in reports. The entire list has been thoroughly revised, and inquiries have been made concerning those from whom reports have not been received for some time. About 300 of such cases have been examined, and about 200 of these can no longer be regarded as regular observers, due to various causes, chiefly the withdrawal of ships from commerce by loss, sale, etc., so that the actual number of observers afloat is now about 3,000, which added to the 118 observers on islands, light-houses, shore stations, and vessels of the U. S. Navy, makes the total number of observers about 3,118, an increase of about 250 during the year.

The meteorological reports are platted on daily synoptic charts, and the number of such reports received every day from the North Atlantic Ocean is about 500, which is evidence of the zeal and interest in the work, especially since none but reliable observations are platted on these charts.

The necessity of improved methods of making meteorological reports on a system of card cataloguing for easy reference and prompt utilization has been recognized. Plans have been studied, but none has yet been fully adopted. The blank forms of reports have been revised and many minor changes in the instructions have been suggested, but, owing to the extremely difficult problem of providing for satisfactory cloud forms, this work is still unfinished.

DIVISION OF BRANCH OFFICES.

Boston.—The demand for the Pilot Chart continues to increase, its ice and fog features being of the greatest value to seamen frequenting this port.

New York.—There is a greatly increasing demand for the different Hydrographic Office publications. Notwithstanding the fact that the

shipping interests have been largely affected by the general depression in business (400 less vessels entered and cleared at this port during the present year than during the previous one) the number of meteorological reports received exceeds by about 700 those of last year.

Philadelphia.—The operations of this office have been to some extent diminished by the general depression in business for the past year.

Baltimore.—The progress of the work of the office is satisfactory when the depressed condition of shipping is considered. Urgent requests have been made for advanced reports of West India hurricanes, and the subject is now under consideration in the main office. The time ball has been dropped regularly.

Norfolk.—The work of the office has progressed satisfactorily and that of the office at Newport News is increasing.

Savannah.—The office continues to be of importance to mercantile interests. Urgent requests having been received for a time-ball service, one will be provided during the coming year.

New Orleans.—The work of this office does not make as good a showing as during previous years, owing to the fact that the assistant was alone in the office for a portion of the time and many vessels could not be visited. Since February the work has progressed satisfactorily.

Chicago.—This office has now become a well-known source of reliable information for the navigators of the Great Lakes. The time-ball service has been installed and is in excellent working order. Much of the labor of gathering the necessary data for the Pilot Chart of the Great Lakes and for the Notices to Lakefarers has fallen upon the Chicago office.

San Francisco.—The past year has been one of advancement. The office is steadily gaining popularity with the maritime portion of the community. The North Pacific Pilot Chart has been received with great favor. The time ball on Telegraph Hill has been dropped regularly.

Portland.—Since April 1, 1894, this office has been quartered in room No. 525 of the Chamber of Commerce, and has now ample space and good light and is readily accessible. The business community shows great interest in the work of this office.

Port Townsend.—This office is now well established and progress has been made during the year, although it has been one of great depression in shipping.

Very respectfully,

C. D. SIGSBEE,
Commander, U. S. Navy, Hydrographer.

The CHIEF OF BUREAU OF NAVIGATION,
Navy Department.

Principal work done by the branch hydrographic offices for the fiscal year ending June 30, 1894.

	Boston.	New York.	Philadelphia.	Baltimore.	Norfolk.	Savannah.	New Orleans.	San Francisco.	Portland.	Port Townsend.	Total.
Vessels visited	1,50.	2,265	881	1,121	27	625	152	533	95	110	7,312
Barometers compared and adjusted	1,276	5,293	872	731	375	172	55	417	.....	62	9,253
Chronometers compared and rated	.....	15	.....	380	6	1	92	57	.....	.....	551
Charts distributed and corrected for merchant captains	.....	437	1,831	42	1,507	183	6	52	.....	45	4,103
Light lists corrected and distributed	1,044	176	234	247	319	246	150	101	61	81	2,659
Buoy lists corrected and distributed	3,769	124	738	233	636	616	410	34	64	9	6,633
General information	11	.....	42	426	0,889	325	791	828	.....	583	12,895
General informaton to individuals	10,482	.....	32,603	5,797	2,532	2,192	1,003	4,803	983	275	60,670
Pilot Charts distributed	3,877	10,680	3,285	1,901	1,862	878	824	853	205	402	24,767
Supplements to Pilot Charts distributed	342	1,186	290	339	278	147	70	26	.....	25	2,703
Notices to Mariners distributed (extracts)	248,330	330,107	430,660	54,826	38,908	57,588	95,644	41,913	7,854	53,249	1,359,139
Meteorological forms distributed	218	715	237	143	148	193	116	255	25	100	2,150
Coast Survey Notices to Mariners distributed	2,091	40,838	.....	47,378	27,923	19,556	22,431	300	270	13,537	174,324
Weather reviews distributed	369	607	533	.....	60	12	75	28	.....	44	1,728
Reports on storms at sea, fog, ice, trade winds, shoals, etc., received	2,066	2,352	912	397	61	204	16	231	67	122	6,428
Hydrographic Office and miscellaneous reports distributed	18,823	12,272	11,815	.....	4,218	3,598	860	3,872	.....	553	56,011

F.

ESTIMATES OF APPROPRIATIONS REQUIRED FOR THE SERVICE OF THE FISCAL YEAR ENDING JUNE 30, 1896, BY THE BUREAU OF NAVIGATION, NAVY DEPARTMENT.

FOR THE SUPPORT OF THE BUREAU OF NAVIGATION.

Salaries, Bureau of Navigation.

One chief clerk (appropriated)	$1,800.00
Two clerks of class 4 (appropriated)	3,600.00
Two clerks of class 3 (appropriated)	3,200.00
Four clerks of class 2 (appropriated)	5,600.00
Three clerks of class 1 (appropriated)	3,600.00
Four clerks at $1,000 each (appropriated)	4,000.00
One copyist (appropriated)	900.00
One copyist (appropriated)	720.00
One assistant messenger (appropriated)	720.00
Three laborers at $660 each (appropriated)	1,980.00
Total	26,120.00

I.—*Salaries, Hydrographic Office.*

Two clerks of class 2 (appropriated)	$2,800.00
One clerk of class 1 (appropriated)	1,200.00
One assistant messenger (appropriated)	720.00
One watchman (appropriated)	720.00
Draftsmen, engravers, assistants, nautical experts, computers, custodian of archives, copyists, copper-plate printers, apprentices and laborers in the Hydrographic Office (appropriated)	40,000.00
Total	45,440.00

II.—*Contingent and miscellaneous expenses, Hydrographic Office.*

Purchase of copper plates, steel plates, chart paper, office furniture, and stationery; electrotyping copper plates; cleaning copper plates; tools, instruments and materials for drawing, engraving, and printing; materials for and mounting charts; data for charts and sailing directions; reduction of charts by photography; photolithographing charts for immediate use; transfer of photolithographic and other charts to copper; care and repair to printing presses, furniture, instruments, and tools; extra drawing and engraving; translating from foreign languages; expert marine, meteorological, and other work in preparation of the Pilot Chart and supplements, and the printing and mailing of the same; and purchase of, compiling, and arranging data for charts and sailing directions and other nautical publications; works and periodicals relating to hydrography, marine meteorology, navigation, and surveying (appropriated)	$30,000.00
Rent of building for printing presses, draftsmen, and engravers; storage of copper plates and materials used in the construction and printing of charts; repairs and heating of the same, and for gas, water, and telephone rates	1,500.00
Contingent expenses of branch offices at Boston, New York, Philadelphia, Baltimore, Norfolk, Savannah, New Orleans, San Francisco, Portland (Oreg.), Portland (Me.), Chicago, Cleveland, and Port Townsend, including furniture, fuel, lights, rent and care of offices, car fare and ferriage in visiting merchant vessels, freight, express, telegrams, and other necessary expenses incurred in collecting the latest information for the Pilot Chart and for other purposes for which the offices were established, including $1,000 for rent of office in New York	17,000.00

For a monthly Pilot Chart of the North Pacific Ocean, showing graphically the matters of value and interest to the maritime community of the Pacific coast, and particularly the directions and forces of the winds to be expected during the month succeeding the date of issue; the set and strength of the currents; the feeding grounds of whales and seals; the regions of storm, fog, and ice; the positions of derelicts and floating obstructions to navigation, and the best routes to be followed by steam and by sail, including the expenses of communicating and circulating information; lithographing and engraving; the purchase of materials for and printing and mailing the chart; the employment of three nautical experts at $1,600 each, and two tabulators and copyists at $720 each (appropriated) $10,000.00

FOR THE NAVAL SERVICE.

I.—*Gunnery exercise.*

For prizes for excellence in gunnery exercise and target practice; diagrams and reports of target practice for the establishment and maintenance of targets and ranges; for hiring established ranges and for transporting to and from ranges (appropriated) $6,000.00

II.—*Ocean and lake surveys.*

Ocean and lake surveys, the publication and care of the results therof, the purchase of nautical books, charts and sailing directions, and freight and express charges on same, preparing and engraving on copper plates the surveys of the Mexican coasts, and the publications of a series of charts of the coasts of Central and South America (appropriated) $14,000.00

III.—*Bounties for outfits for naval apprentices.*

Bounties for outfits of 750 naval apprentices at $45 each (appropriated) .. $33,750.00

IV.—*Recruiting, transportation, and contingents.*

Expenses of recruiting for the naval service, rent of rendezvous and expenses of maintaining the same, advertising for men and boys, and all other expenses attending the recruiting for the naval service, and for the transportation of enlisted men and boys at home and abroad; for heating apparatus for receiving and training ships, and extra expenses thereof; for freight, telegraphing on public business, postage on letters sent abroad, ferriage, ice, apprehension of deserters and stragglers, continuous-service certificates, discharges, good-conduct badges, and medals for boys; schoolbooks for training ships; packing boxes and materials, and other contingent expenses and emergencies arising under cognizance of the Bureau of Navigation unforeseen and impossible to classify (appropriated) $45,000.00

V.—*U. S. naval station, Newport, R. I.*

Maintenance of office of commandant, stationery, heating, furniture, freight, and other contingent expenses (submitted)	$1,000.00
Quarters for commandant (submitted)	16,000.00
Total	17,000.00

VI.—*Naval training station, Coasters Harbor Island, Rhode Island (for apprentices).*

Dredging channels, repairs to main causeway, roads and grounds; extending sea wall, and the employment of such labor as may be necessary for the proper care and preservation of the same; for repairs to wharf and sea wall; for repairs and improvements on buildings; heating, lighting, and furniture for same; books and stationery, freight, and other contingent expenses; purchase of food and maintenance of live stock, and mail wagon and attendance on same (appropriated) ...	$30,000.00
Barracks, wash and bath houses, and outbuildings for apprentices (submitted)	125,000.00
For coal house, as per plan (submitted)	8,500.00
For hospital for station (submitted)	20,000.00
Total	183,500.00

VII.—*Naval War College and Torpedo School.*

Maintenance of the Naval War College and Torpedo School on Coasters Harbor Island, and care of grounds for same (appropriated)	$8,000.00

VIII.—*U. S. Naval Academy, pay of professors and others.*

For one professor of mathematics, one of chemistry, and one of physics, at $2,500 each (appropriated)	$7,500.00
For two professors (assistants), viz, one of French and Spanish and one of English studies, history, and law, at $2,200 each (appropriated)	4,400.00
For five assistant professors, viz, one of English studies, history, and law; three of French, and one of drawing, at $1,800 each (appropriated)	9,000.00
For one swordmaster at $1,500; and two assistants at $1,000 each (appropriated)	3,500.00
For one boxing master and gymnast (appropriated)	1,200.00
For one assistant librarian (appropriated)	1,400.00
For one secretary of the Naval Academy (appropriated)	1,800.00
For two clerks to the superintendent at $1,200 and $1,000, respectively (appropriated)	2,200.00
For one clerk to the commandant of cadets (appropriated)	1,200.00
For one clerk to the paymaster (appropriated)	1,200.00
For one dentist (appropriated)	1,600.00
For one baker (appropriated)	600.00
For one mechanic in department of physics and chemistry (appropriated)	730.00
For one cook (appropriated)	325.50
For one messenger to the superintendent (appropriated)	600.00
For one armorer (appropriated)	649.50
For one chief gunner's mate (appropriated)	529.50
For one quarter gunner (appropriated)	469.50
For one coxswain (appropriated)	469.50
For one seaman in department of seamanship (appropriated)	397.50
For one attendant in department of astronomy, and one in the department of physics and chemistry at $300 each (appropriated)	600.00
For six attendants at recitation rooms, library, store, chapel, and office at $300 each (appropriated)	1,800.00
For one bandmaster (appropriated)	528.00
For twenty-one first-class musicians at $348 each (appropriated)	7,308.00
For seven second-class musicians at $300 each (appropriated)	2,100.00
For services of organist at chapel of Naval Academy at $300 (appropriated)	300.00
Total	52,407.00

Special course of study and training of naval cadets.

For special course of study and training of naval cadets, as authorized by act of Congress, approved August 5, 1882 (appropriated)	$3,000.00

For pay of watchmen, mechanics, and others.

For captain of the watch and weigher at $2.50 per diem (appropriated)	$912.50
For four watchmen at $2 per diem (appropriated)	2,920.00
For foreman of gas and steam heating works of the Academy at $5 per diem (appropriated)	1,825.00
For labor at gas works, and steam buildings; for masons, carpenters, and other mechanics and laborers, and for care of buildings, grounds, wharves, and boats (appropriated)	37,864.95
For one attendant in purifying house of gas house at $1.50 per diem (appropriated)	547.50

For pay of steam employés, Naval Academy.

For pay of mechanics and others in department of steam engineering (appropriated)	$7,824.50

For repairs and improvements, Naval Academy.

For necessary repairs of public buildings, pavements, wharves, and walls inclosing the grounds of the Naval Academy; improvements; repairs; furniture and fixtures (appropriated)	$21,000.00

Heating and lighting, Naval Academy.

For fuel and for heating and lighting Academy and school ships (appropriated)	$17,000.00
*For fuel and for heating and lighting Academy and school ships (submitted)	3,000.00

Contingent and miscellaneous expenses.

For purchase of books for the library (appropriated)	$2,000.00
For stationery, blank books, models, maps, and text-books, for use of instructors (appropriated)	2,000.00
For expenses of Board of Visitors to Naval Academy; being mileage and $5 per diem for each member and for expenses during actual attendance at the Academy (appropriated)	1,500.00
For purchase of chemicals, apparatus and instruments in the department of physics and chemistry and for repairs of same (appropriated)	2,500.00
For purchase of gas and steam machinery; steam pipe and fittings; rent of buildings for the use of the Academy; freight; cartage; water; music; musical and astronomical instruments; uniforms for the bandsmen; telegraphing; feed and maintenance of teams; current expenses and repairs of all kinds; and for incidental labor and expenses not applicable to any other appropriation (appropriated)	32,000.00
For stores in the department of steam engineering (appropriated)	800.00
For materials for repairs in steam machinery (appropriated)	1,000.00
Total	41,800.00

For improvement of water front.

†For continuing the grading and improvement of the property condemned under act making appropriations for the naval service for the fiscal year ending June 30, 1890, and the adjacent ground and for the improvement of the water front of the Academy, to be immediately available (appropriated)	$10,000.00

RECAPITULATION.

NAVAL ACADEMY.

For pay of professors and others	$52,407.00
For special course of study	3,000.00
For pay of watchmen and others	44,069.95
For pay of steam employés	7,824.50
For repairs and improvements	21,000.00
For contingent and miscellaneous expenses	41,800.00
For improvement of water front	10,000.00
For heating and lighting Naval Academy	20,000.00
Total	200,101.45

*For the fiscal years ending June 30, 1893, and June 30, 1894, there were deficiencies. During those two years the most rigid economy was observed, and at times the supply of light and heat was inadequate. Four new sets of quarters will be added to the heating and lighting system, and it is estimated that the increased amount asked for will be necessary for the proper heating and lighting of the Naval Academy.

†This amount is necessary for the grading and improvement of new grounds purchased by authority of act of 1890 and for continuing the sea wall. Thirty thousand dollars was estimated for these purposes last year, which estimate was reduced to $10,000. The balance is needed for completing the grading of new grounds and for improvement to water front. The latter improvements are urgently needed to correct the questionable sanitary conditions, resulting from the fact that the sewage from the Academy is not fully carried off by flow of tides; also, to prevent overflow of lower part of grounds during easterly gales; this overflow has during recent years seriously damaged the gas works and endangered the lighting system.

FOR THE SUPPORT OF THE BUREAU OF NAVIGATION.

A.—I.	Salaries, Bureau of Navigation	$26,120.00
B.—I.	Salaries, Hydrographic Office	45,440.00
B.—II.	Contingent and miscellaneous expenses, Hydrographic Office	58,500.00
	Total	130,060.00

FOR THE NAVAL SERVICE.

I.	Gunnery exercise	$6,000.00
II.	Ocean and lake surveys	14,000.00
III.	Outfits for naval apprentices	33,750,00
IV.	Recruiting transportation, and contingent navigation	45,000.00
V.	Naval station, Newport, R. I.	17,000.00
VI.	Naval training station, Coasters Harbor Island, Rhode Island	183,500.00
VII.	Naval War College and Torpedo School	8,000.00
VIII.	Naval Academy	200,101.45
	Total	507,351.45

ANNUAL REPORT

OF

THE CHIEF OF THE BUREAU OF ORDNANCE.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., October 1, 1894.

SIR: I have the honor to submit the annual report of this Bureau, and also to transmit estimates for the fiscal year ending June 30, 1896:

ESTIMATES.

(1)	Fuel, tools, material and labor, expenses of target practice, maintenance of new proving ground, modern battery for *Hartford*, reserve supply of guns and projectiles, and an additional supply of torpedoes	$882,058.50
(2)	General repairs to ordnance buildings, machinery, magazines, and appendages	30,000.00
(3)	Removal of magazine, Craney Island, to a more suitable locality	75,000.00
(4)	General expenses of the Torpedo Station	60,000.00
(5)	Toward the armament of auxiliary cruisers	500,000.00
(6)	Freight and miscellaneous expenses	8,000.00
(7)	Arming and equipping naval militia	25,000.00
(8)	Improvements at the naval proving ground, Indian Head, Md	20,000.00
(9)	Civil establishment at navy-yards	26,824.00
(10)	Toward the armament of vessels authorized	5,237,670.00
	Total	6,864,552.50

BREECH-LOADING RIFLES.

The following table shows the status of the guns required to arm with modern batteries all vessels thus far authorized:

Caliber.	Number of sets of forgings.		Number of guns completed to date.	Number of guns partly completed.	Number of guns afloat.
	Ordered.	Delivered.			
4-inch	107	* 107	68	20	56
5-inch	86	86	60	26	46
6-inch	141	141	135	6	96
8-inch	68	* 68	33	19	22
10-inch	26	† 26	† 26	0	10
12-inch	13	10	8	1	2
13-inch	12	12	10	2	0
Total	453	450	340	74	232

* All delivered, but several forgings have been rejected and have to be replaced by the contractors.
† Includes one set of 10-inch forgings assembled as an 8-inch Hurst gun.

Of the 453 guns of all calibers from 4-inch to 13-inch ordered, 340 have been completed and 232 are already afloat.

From the beginning of the work of reconstruction of the Navy the system of gun construction in use has remained unchanged. Other systems, notably that of wire-winding guns, have been presented to the Bureau and carefully considered, but the gun built up of steel forgings assembled with shrinkage by heat is still, in the Bureau's opinion, the strongest, most enduring, and most powerful. An efficient and probably a cheaper gun can be constructed on the plan of a forged steel tube reenforced by wire, the breech plug engaging in the tube, and it may perhaps be well to develop this system as offering a means of rapidly arming ships in case of an emergency. Beyond this, however, the Bureau considers no other system of gun construction yet proposed worthy of development at Government expense.

The 8-inch nickel steel gun mentioned in the last report has been assembled and is nearing completion. Its construction does not differ radically from that of other built-up guns, and the principal interest attached to its trial is in regard to the behavior of the nickel steel of which it is built.

Two 6-inch rapid-fire guns, one with the Dashiell and the other with the Fletcher breech mechanism, have been completed and are on the firing ground being tested. The first lot of 6-inch cartridge cases, with electric primers, has been delivered and has proved entirely satisfactory.

A 3-inch field gun with Fletcher breech mechanism has been completed and partially tested at the Naval Proving Ground with satisfactory results. It is proposed in the near future to test this in competition with other field guns of the Hotchkiss and Driggs-Shrœder types, with a view to the adoption of one or the other for service use.

Although the modern guns required to arm the vessels thus far authorized by law are now practically completed, the Bureau considers that it would be unwise to cut short the work of gun construction until a reserve supply of guns of all calibers has been created for use in an emergency. The guns needed for new ships hereafter authorized can well be built concurrently with the construction of the ships themselves, but a certain number of guns of each caliber should be kept on hand to replace any damaged in service and more especially for the purpose of arming such improvised war ships as will be called into service in the event of war. No private manufacturer can afford to keep on hand a stock of guns of any considerable size, and it will be only prudent for the Government to maintain such a stock itself. In the Bureau's opinion there is not the slightest danger of the present system of gun construction being so far improved upon as to render the guns now in use obsolete, and accordingly the recommendation is made that the construction of an additional number, equal to 10 per cent of those now authorized, be begun at once and an estimate therefor is herewith submitted.

During the year the Sponsel Gun Company requested the Bureau to test a 6-pounder gun of their design, and a board was appointed to test this gun in competition with Hotchkiss and Driggs-Schroeder guns of the same caliber. The report of this board will be found in the Appendix, and the Bureau wishes to emphasize the statements therein made, that the introduction of different types of guns into the service has very grave disadvantages, and that nothing but marked superiority can justify the introduction of a new type of guns when others of the same class are already in service.

Experience in service and on the proving grounds during the past

years has suggested numerous improvements in the Hotchkiss and Driggs-Schroeder systems, and these having now been embodied in new designs, the guns hereafter issued to service will be designated as Mark II guns. These new model mechanisms are to a large degree interchangeable with the old models already in service.

The following table shows the present condition of the work upon secondary battery guns for both the old and new vessels:

Gun.	Number ordered.		Number completed.		Ordered but not completed.		Number afloat.	
	Hotchkiss.	Driggs.	Hotchkiss.	Driggs.	Hotchkiss.	Driggs.	Hotchkiss.	Driggs.
37-millimeter	77	0	77	0	0	0	50	0
47-millimeter	18	0	18	0	0	0	8	0
1-pounder (light)	18	0	18	0	0	0	16	0
1-pounder (heavy)	118	15	93	15	25	0	41	4
3-pounder	38	10	38	10	0	0	33	2
6-pounder	162	140	152	125	10	15	88	44
Total	431	165	396	150	35	15	236	50

The 8-inch Hurst gun, referred to in the last report, has been completed at the Washington navy-yard, and will shortly be sent to Indian Head for test.

During the year the Bureau has drawn up and issued to the service for the instruction and information of officers and men a description with plates of the modern ordnance in use in the Navy. A second publication describing the gun mountings in use will also be issued shortly, and a third part containing descriptions of ammunition and other ordnance materials is in course of preparation.

A complete description of the Whitehead torpedo, profusely illustrated, has been prepared at the torpedo station and issued to the service. A manual for the use of torpedo officers has also been issued, giving detailed instructions regarding the care and handling of these torpedoes. Similar publications in regard to the Howell torpedoes are now in the hands of the printer. A drill book suitably illustrated for the various mounts used for torpedoes is now under revision at the torpedo station. A handbook for seamen gunners on the subject of diving has been printed and will be issued as soon as the plates are ready.

When all these publications have received the revision resulting from actual service they will be combined to constitute an Ordnance Instructions to replace the now obsolete volume on these subjects.

BROWN PRISMATIC POWDER.

The California Powder Company, of Santa Cruz, Cal., has lately made very satisfactory powder for the 5-inch rapid-fire gun, and orders have been placed with them for powder for guns of larger caliber.

DuPont & Co. have made some progress in the manufacture of powder for the 12-inch and 13-inch guns, though not as much as desirable.

The retests of several lots of brown powder which have been stored in the magazines of cruising vessels for several years show the velocities and pressures to be practically unchanged, a result which is very satisfactory in the highly important matter of keeping qualities.

SMOKELESS POWDER.

The experimental work at the naval torpedo station in the production of a smokeless powder for rapid-fire guns has been actively carried forward, and powders made by the new processes adopted have given ballistic and keeping results quite equal to those of powders accepted abroad as satisfactory.

A number of samples of smokeless powders of foreign and domestic manufacture have been tested at the naval proving ground during the year in rapid-fire and heavier guns.

The foreign powders tested have not given satisfactory results.

The ballistic results given by nitroglycerine powders have been excellent, but the experiments made with them have tended to confirm the opinion that they are unfitted for military purposes.

STOWAGE OF MAGAZINES AND THE SUPPLY OF AMMUNITION ON BOARD SHIP.

The system of stowage of ammunition has not been changed. The solid linings of the magazines of ships undergoing repairs have been removed where possible, and removable gratings and battens substituted. The Bureau is confirmed in its policy of removing the solid lining of all ship magazines by reports from vessels in commission which show that wooden linings are liable to decay, due to the impossibility of getting at the steel surfaces and keeping them dry.

Since the date of the Bureau's last report plans have been approved for the latest ships which will prevent to a great extent any heating of their magazines.

The 5-inch ammunition hoist for the *Cincinnati* has been completed and installed, and three 5-inch ammunition hoists for the *Olympia* have been completed and are being installed.

The Bureau has under consideration an electric controlling device for these hoists, and the electric hoists of the *New York*, and if on trial this proves satisfactory its application to these hoists will improve their management materially.

The ammunition hoists of the *Columbia* and *Minneapolis* have been installed and work satisfactorily. They are after a design made by the shipbuilders, and approved by the Bureau.

A 6-inch ammunition design for the *Maine* has been made and the hoist is now being built at the New York navy-yard.

GUN MOUNTS.

Satisfactory progress has been made in the mounting of heavy guns, both as regards the amount of work completed and improvement in design.

The four 8-inch turret mounts for the *Olympia* were built and are now being installed. They are the same type as those on board the *New York*, which have been tested in service during the past year and are reported to be entirely satisfactory.

The 10-inch mounts of the *Maine* and the 12-inch mounts of the *Texas* have been completed and are being placed on board these vessels. These mounts, with the 13-inch mount permanently in place at Indian Head, are of the closed recoil-cylinder type; they have all stood the test of repeated firings, and are strong and reliable.

Four 10-inch mounts for the *Amphitrite* and four 12-inch mounts for

the *Puritan* have been completed. The former are being installed on board. Four 13-inch of the same type for the *Indiana* are well under way toward completion, and one of them is now being erected in the shops.

The first 8-inch spring return turret mount will be ready for trial at the proving ground within a few days.

While the hydraulic system of operating heavy guns has proved satisfactory and reduced the manual labor required to a minimum, the liability of the guns being disabled by the failure of one of the numerous hydraulic fittings in time of action has induced the Bureau to design mounts which can be entirely manipulated by hand. With this end in view, designs have been prepared for mounting the 12-inch guns of the *Iowa* so that they are balanced and can be elevated by hand. They are to be returned to battery by the energy stored up in powerful springs when the gun recoils, and the projectile and powder charge are to be manipulated by electricity, but in case of a breakdown in the electric gear arrangements are to be provided with which hand power can instantly take its place. Besides the prime advantage of having a mounting that is difficult to disable, there will be a great saving of weight and cost, as pumping machinery, piping, and heavy hydraulic elevating cylinders are dispensed with.

Castings for eight rapid-fire 6-inch mounts have been ordered, and the work on one mount is nearly completed.

These mounts are unassigned at present, but it is the intention of the Bureau to place them, with guns having rapid-fire breech mechanism, on board some of our commerce destroyers, replacing 6-inch guns and mounts of the ordinary type.

The 5-inch rapid-fire mounts thus far issued to service are fitted with directing bars. In the three special mounts (Mark IV), which are intended one each for the forecastles of the *Detroit*, *Montgomery*, and *Marblehead*, to replace the 6-inch central-pivot mounts landed from those vessels, the directing bars have been omitted and side training wheels provided similar to 4-inch rapid-fire mount Mark III.

A new 5-inch mount, designated Mark V, has been designed and detail drawings are now being made. The design places the elevating and training in the hands of the gun captain, who stands on the left of the gun and close to the mount. Telescope sights will be fitted to these mounts. In this mount the gun recoils within a cylindrical sleeve, the recoil cylinder and spring cylinders being attached to it, and the pistons are attached to a band on the after-part of the gun. One of this type will be built, and if it proves successful the 5-inch mounts of the *Brooklyn* will be of this type. A change has been made in the friction clutches of 5-inch and 4-inch mounts, and they are being changed in all ships as rapidly as possible. The old clutches were found in actual service to be not as positive as was desirable, and the new ones were designed to overcome this defect.

Six of the 4-inch rapid-fire mounts, Mark III, without directing bars have been installed in the *Essex*, and under service conditions give great satisfaction, and six of the same type will be placed in the *Alliance* during the present month.

A new design of 4-inch rapid-fire mount, similar to 5-inch rapid-fire mount, Mark V, will be made, and the 4-inch mounts of the *Iowa* will be made after this design.

The work on all the smaller mounts from 6-inch down has been much delayed during the year by the great difficulty found in obtaining good steel castings. A large proportion of the castings received from several

makers who have obtained the largest contracts has been rejected on ballistic test or on account of blowholes or other imperfections. The rejections on one contract amounted to more than 40 per cent of the number of castings received.

Such a state of affairs is productive of considerable delay and often expense in machining before the imperfections are discovered. Under the present system of competitive bids some manufacturers often take contracts at prices which forbid the possibility of their furnishing good castings.

Orders have been placed up to the present time for sets of steel castings for gun mounts as follows:

Caliber of gun.	Required.	Ordered.	Delivered.	Due.	Still to be ordered.
4-inch	107	77	75	2	30
5-inch	71	66	47	0	5
6-inch	109	109	103	6	0
8-inch	58	58	19	39	0
10-inch	14	14	14	0	0
12-inch	12	8	8	0	4
13-inch	13	13	9	4	0

The unfinished orders are now in the hands of two firms, and the number able to supply castings of the required quality and pattern has increased from one in 1887 to at least seven at the present time. Nevertheless, the Bureau has met with the greatest difficulty in having its contracts completed with dispatch. Competition has been extremely active in this industry, and the price paid is much less than in 1888. This reduction has been made possible by increased facilities, experience, system, and economy at the works, as well as a diminution of the profits. The temptation to evade the specifications and deceive the inspectors in passing upon material has of course steadily increased. Certain of the castings supplied by two firms were found to contain defects which had been concealed from the inspector. In addition, one of these firms, by re-marking castings which had been rejected and returned to their works, and a fraudulent manipulation of the tests, again endeavored to secure their acceptance. These frauds have been placed in the hands of the U. S. district attorney of the district in which they occurred for prosecution. It is believed important that the criminal intention to defraud the Government into the acceptance of inferior or unsuitable material other than that required by the specifications of the contract agreed to, whether for ordnance or other material intended for the national defense, should be suitably punished by law, somewhat as is prescribed in the case of boiler material. The system of inspection is being improved and made more thorough as experience indicates the necessity. Where frauds are perpetrated, however, they are seldom if ever of such a technical nature as would deceive the most inexperienced inspector. They consist usually of substitutions, evasions, secret treatments, and concealments which require rather a knowledge of chicanery and double dealing than metallurgical processes.

The following table shows the status of mounts required to arm the new vessels thus far authorized:

Main battery mounts.

Caliber.	Required or ordered.	Completed.	In course of completion.	Not yet commenced.
4-inch	104	60	13	31
5-inch	71	55	9	7
6-inch	130	119	4	7
8-inch	66	26	1	39
10-inch	*22	*14	8	0
12-inch	12	5	3	4
13-inch	13	1	4	8
Total	418	280	42	96

* Includes mounts built by contract for four guns of the *Terror*.

TURRET-TURNING MACHINERY.

For rotating the turret the Bureau has the choice of steam, electricity, pneumatic, and hydraulic power; in the case of steam power its use is limited largely by the absolute protection that must be given the engines. In those ships for which it has been adopted the machinery is placed below the protective deck and the turrets are turned by using the ammunition tube for a shaft, or by running separate steel shafts up to the turret structure. This system is not altogether satisfactory, as considerable space in the handling room is taken up by the engines and the temperature may become uncomfortably high; nor is the control of the rotation of the turret as perfect as is desirable in training guns. The necessity for leading steam pipes from the boilers through numerous bulkheads to the handling rooms is a highly objectionable feature.

With the use of hydraulic power, the danger of bursting steam pipes and the heating effect is obviated, but in case of injury to the piping the machinery will be disabled as effectually as it would be were steam the motive power.

The use of compressed air is subject to the same disadvantage and is also objectionable on account of the difficulty of packing joints subject to high pneumatic pressures.

Electricity presents none of the above enumerated disadvantages, but its application as a motive power for turning turrets, where the load may change when the ship is rolling from the maximum to a negative load in an instant, is a problem not easy of solution.

The Bureau has had experimental machinery attached to the turrets of the monitor *Montauk* at the League Island navy-yard. From the success obtained in this experiment the difficulties of control appear to be reduced to an inconsiderable amount, but it must be admitted that the machinery is cumbersome and expensive. In weight, space occupied, and cost steam has greatly the advantage over any other power.

Hydraulic power is the heaviest and most expensive, but it unquestionably gives the best control. During the year the *Monterey* was sent to sea to test the operation of her turrets and guns in a sea way. It was stated in the report that the pointing could be done as accurately with the ship rolling 15 degrees as when at anchor. However, al things considered, the Bureau is of the opinion that with good control

electricity is preferable to any other method of turning turrets, and the subject is receiving the attention of the Bureau with a view to its adoption for the *Iowa* and *Brooklyn*.

TURRET-GUN SIGHTS.

The question of sighting turret guns is one that has received considerable attention on the part of the Bureau. A telescope sight has been made and tested for accuracy, with such promising results that the Bureau feels no hesitation in adopting the design. Full benefit of the great accuracy of fire with modern rifles can not be obtained unless they are accurately sighted, and the telescope sight reduces the personal error of the gun captain to a minimum.

MODERN BATTERIES FOR OLD VESSELS.

During the present year a modern battery of six 4-inch rapid-fire, four 6-pounders, and two 1-pounders has been placed in the *Essex*, and has been in service for some months. The same battery has been authorized for the *Alliance*, and it will be installed during the present month, the Bureau having been able to assign mounts nearly completed at the time the battery was authorized, to this ship.

Plans for a new battery for the *Hartford*, to consist of thirteen 5-inch rapid-fire guns, four 6-pounders, and two 10-pounder-field guns have been approved, and the Bureau is only waiting for an appropriation for this purpose to proceed with the work.

The *Alert* has been furnished during the year with two 6-pounders of the latest type, and the Bureau is awaiting the return of the *Portsmouth* to install two modern 6-pounders in her for the instruction of apprentices.

Two 3-pounder guns and mounts of the latest type have been ordered installed in the permanent training ship *Constellation* at Newport, R. I., for the instruction of apprentices at that station.

It is the intention of the Bureau to furnish all training ships with small rapid-fire guns, as they become available, in order that apprentices may go to service ships with a knowledge of modern weapons.

The wooden vessels which are found worthy of being kept in commission will be furnished with modern batteries as fast as the small annual appropriations for that purpose will permit.

PROJECTILES.

No further contracts have been made during the year for projectiles, a sufficient number to complete the outfits of all ships thus far authorized having been already ordered, with the exception of common shell for the 13-inch guns of the battle ships. These latter shell will be contracted for after competitive test of shell submitted by several manufacturers. The 13-inch common shell has been designed with a view of obtaining considerable armor-piercing capacity, combined with explosive effect. The shell submitted were made from the Bureau's designs, but some are of cast and others of forged steel, the latter being, of course, the more expensive, and it is the object of the test, which will take place shortly, to determine which make of shell is the most efficient and the most desirable, price being considered as well as performance.

Considerable experimental work has been carried out during the year with different kinds of armor-piercing shell designed for use against

hard-face armor as well as against armor of ordinary type. Among the shell tested the cast-steel 10-inch and 12-inch made by I. G. Johnson & Co., Spuyten Duyvil, N. Y., have proved the most satisfactory and efficient, and there seems good reason to believe that as efficient shell can be made of cast steel, properly treated, as have yet been produced by forging, with the result of a considerable cheapening of this very expensive ordnance material. All the armor-piercing shell thus far issued to the service have been manufactured either by the Carpenter Steel Company or the Sterling Steel Company, and the number of these shell of each caliber ordered and delivered is shown in the following table:

Caliber.	Ordered.	Delivered.	Due.
4-inch	2,108	2,108	
5-inch	1,365	1,365	0
6-inch	2,209	2,209	0
8-inch	1,959	1,959	0
10-inch	1,034	1,034	0
12-inch	543	543	0
13-inch	504	354	150
Total	9,722	9,572	150

The manufacture and delivery of steel common shell of the various calibers by the United States and the American Projectile companies and the Taylor Iron and Steel Company has continued during the year, but no new contracts have been made, as all the shell needed for immediate use have already been ordered.

The status of all orders thus far placed for steel common shell and shrapnel for main battery guns is shown in the following table:

Caliber.	Shrapnel.		Shell.	
	Ordered.	Delivered.	Ordered.	Delivered.
4-inch	2,000	1,500	35,268	32,768
5-inch	2,000	1,000	18,000	17,500
6-inch	3,000	1,000	18,200	18,200
8-inch			1,500	None.
10-inch			1,256	1,206
12-inch			554	454
13-inch				
Total	7,000	3,500	74,778	70,128

Cast-iron shell are no longer manufactured for service use.

An examination of the preceding tables will show that the work of manufacturing projectiles for the Navy has been practically completed. The Sterling Steel Company, the United States Projectile Company, and the Taylor Iron and Steel Company have finished up all their contracts and their projectile departments are at a standstill, and the Carpenter Steel Company will soon be in the same position. It would be the part of wisdom for the Department to place orders for the manufacture of a considerable reserve supply of projectiles of all calibers, not only because at any moment an emergency may arise making them urgently necessary, but also to prevent the scattering of the skilled labor which has developed this manufacture, and to keep occupied the plants which were established solely to meet the Government's demands, and which, without further orders, will deteriorate or even disappear.

Accordingly the Bureau recommends the further purchase of projectiles to the extent of $130,000, and submits herewith estimates covering their cost.

During the year some interesting experiments have been made with shell loaded with gun cotton and fired from the 6-inch gun with a velocity of about 1,400 foot-seconds. These shell weighed 80 pounds, and contained about 11 pounds of wet gun cotton together with a dry gun cotton primer and a fulminate detonator. When fired into the side of a hill they detonated with tremendous violence, making a large crater and throwing stones and mud hundreds of feet in all directions. One was then fired against a 7-inch armor plate, unbacked, and only lightly supported by struts. This shell detonated against the face of the plate, being itself shivered into minute fragments, but produced no effect upon the plate beyond a slight indentation and a few scratches. On increasing the powder charge so as to give over 1,800 foot-seconds velocity, one of these gun cotton shell exploded in the bore, enlarging it considerably at the point of explosion, some 6 calibers forward of the chamber. Investigation has satisfied the Bureau that this accident was caused by insufficient strength of the shell walls themselves. The shell were of soft steel, bored out so that the walls were but 0.3 inch in thickness, and under the pressure in the bore the walls bulged, taking the rifling and checking up the shell sufficiently to cause the dry primer, with its fulminate cap, to fly forward and explode, as it is designed to do, on impact. It is now proposed to manufacture some 10-inch shell containing about 70 pounds of gun cotton, and no doubt is entertained of the entire feasibility and safety of using such shell for the 10-inch service guns with the reduced charge (giving 1,700 f-s M. V.) used in target practice and for shrapnel.

During the year new designs of projectiles for the small rapid-firing guns have been prepared by the Bureau, and hereafter all such shell ordered will be made accordingly. These designs embody certain improvements, but are principally intended to procure uniformity of ammunition, the armor-piercing and common shell of each caliber being now made of the same length and weight, and the Hotchkiss and Driggs-Schrœder shell being now made exactly alike.

It is proposed in the near future to introduce a similar reform in the designs of projectiles of the larger calibers. The development of different methods of manufacture by different companies and the use of various classes of projectiles, cast iron, cast steel, wrought steel, etc., have resulted in numerous designs differing in unessential features, and the advantages to be gained by introducing, as far as possible, uniformity of dimensions in all the projectiles of each caliber are apparent.

ARMOR CONTRACTS.

Since the date of the last annual report, October 1, 1893, 4,936.7 tons of armor have been delivered, of which 2,346.2 tons were Harveyed, and consisted of the side armor of the *Maine*, *Indiana*, and *Brooklyn*, twenty-seven plates of the *Iowa's* casemate, the 8-inch B. L. R. turrets for the *Olympia*, two of the 8-inch B. L. R. turrets for the *Indiana*, and the 13-inch B. L. R. and 8 inch B. L. R. barbettes for the *Massachusetts*. A better indication of the progress of the contracts is given in the amount of armor accepted ballistically during the year, which is 4,165.8 tons, all of which, except 782.1 tons, is Harveyed.

The manufacturing facilities, both at Bethlehem and Homestead, have been greatly improved. Both firms have added powerful forging

presses, while the Carnegie Steel Company has in addition erected twelve Harveying furnaces. These developments of the plants are of such a character as to represent actual advances in the art, making these firms the best equipped in the world.

The output of armor at both establishments has steadily increased with the greater experience and improved appliances. The Bethlehem manufacturers have practically completed the forging of all armor at present ordered, while at Homestead all but one 13-inch B. L. R. barbette for the *Oregon* and the *Katahdin's* conning tower have been completed under the contract of November 20, 1890, and all the thin armor has been forged and most of it delivered under that of January 16, 1893.

Should additional armored vessels be authorized in the coming session of Congress, it is evident that the Bethlehem Iron Company would have completed their present contract when the appropriations became so far operative as to permit the armor shapes to be ordered, while in the case of the Carnegie Steel Company, a similar condition would exist. At both establishments the forging and rough machining of all armor will be completed at a much earlier date. Should appropriations be deferred until the succeeding Congress, becoming operative July 1, 1896, both armor plants would have been practically idle for more than a year, the organizations would be broken up, and the skilled labor created at much expense of time and money, either lost or diverted.

It is believed, therefore, that better terms should be obtained on new contracts at the present time than later.

The following table summarizes the present condition of the contracts for the armor of the different ships at the two plants:

Statement of armor contracts to October 1, 1894.

Vessel.	Description.	Thickness.	Amount required.	Amount delivered.		Amount to be delivered.		Probable date of delivery.
				Bethlehem.	Carnegie.	Bethlehem.	Carnegie.	
		Inches.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Amphitrite	Side armor	9-5	348.90		348.90			Completed.
	Barbettes	11½	145.56	145.56				Do.
	Turrets	7½	106.20	106.20				Do.
	Conning tower	7½	16.97	16.97				Do.
	Conning tower tube	3	.99	.99				Do.
	Smoke pipe	6	15.09	15.09				Do.
	Ventilator	6	8.12	8.12				Do.
Monadnock	Side armor	9-5	349.23		349.23			Do.
	Barbettes	11½	145.87		145.87			Do.
	Turrets *	7½	91.13			91.13		Apr., 1895.
	Conning tower	7½	19.28	19.28				Completed.
	Conning tower tube	3	1	1				Do.
	Smoke pipe	6	19.97	19.97				Do.
	Ventilator	6	7.69	7.69				Do.
Puritan	Side armor	6-10-14	587.59	450.18	112.59	24.82		Mar., 1895.
	Barbettes	14	254.52	254.52				Completed.
	Turrets *	8	162			162		Mar., 1895.
	Conning tower	10	26	3.28		22.72		May, 1895.
	Conning tower tube	3	1			1		Do.
	Smoke pipe	6	18.45	18.45				Completed.
	Ventilator	6	9.46	9.46				Do.
Terror	Side armor	6-7	355.82	67.05	288.77			Do.
	Turrets	11½-12½	236.77	236.77				Do.
	Sighting tower	12	13.80			13.80		Oct. 10, 1894.
	Sighting tower tops	2½						
	Smoke pipe	6	15.59	15.59				Completed.
	Ventilator	6	8.44	8.44				Do.

* Harveyized.

Statement of armor contracts to October 1, 1894—Continued.

Vessel.	Description.	Thickness.	Amount required.	Amount delivered.		Amount to be delivered.		Probable date of delivery.
				Bethlehem.	Carnegie.	Bethlehem.	Carnegie.	
		Inches.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Monterey	Side armor	6-8-13	334.86		334.86			Completed.
	Barbettes	11½-13	157.35	157.35				Do.
	Turrets	7½-8	143.93		143.93			Do.
	Conning tower	10	24.74		24.74			Do.
	Conning tower tube	6	4.68		4.68			Do.
	Smoke pipe	6	14.56		14.56			Do.
	Ventilator	6	9.33		9.33			Do.
Indiana	Side armor *	* 18	644.18	576.58		67.60		Oct., 1894.
	Diagonal armor	14	245.46	245.46				Completed.
	Barbettes, 13-inch B. L. R.	17	777.80	777.80				Do.
	Barbettes, 8-inch B. L. R.	6-8	153.62	153.62				Do.
	Turrets, 13-inch B. L. R †	15	358.21			358.21		Mar., 1895.
	Turrets, 8-inch B. L. R.†	6	141.56		71.42		70.14	Oct., 1894.
	Conning tower	10	43.30			43.30		Do.
	Conning tower tube	7	11.80	11.80				Completed.
	Casemate armor	4	177.62		177.62			Do.
	Sponsons	2-4	41.32		41.32			Do.
	Ammunition tube	1½-3	56.21	56.21				Do.
Iowa	Side armor†	7-14	630.60				630.60	Mar., 1895.
	Diagonal armor†	7-12	234.70			234.70		July, 1895.
	Barbettes, 12-inch B. L. R.†	15	521.00				521.00	Nov., 1894.
	Barbettes, 8-inch B. L. R.†	6-8	148.40				148.40	Do.
	Turrets, 12-inch B. L. R.†	15	545.50			545.50		July, 1895.
	Turrets, 8-inch B. L. R.†	5	135.50				135.50	Apr., 1895.
	Conning tower	10	40.30			40.30		July, 1895.
	Conning-tower tube	7	14.50			14.50		Dec., 1894.
	Casemate armor †	4	203.40		156.86		46.54	Nov., 1894.
	Sponsons	2-4	31.68		31.68			Completed.
	Splinter bulkheads	1½	16.42		16.42			Do
	Ammunition tube	3	54.50			54.50		June, 1895.
Maine	Side armor†	12	521.62	521.62				Completed.
	Barbettes	10-12	412.66	412.66				Do.
	Turrets†	8	143.00			143.00		Oct 30, 1894.
	Conning tower	10	33.22	33.22				Completed.
	Protective deck	3	50.24	50.24				Do.
	Forward bulkhead	6	33.79	33.79				Do.
Oregon	Side armor †	18	613.56				613.56	Jan., 1895.
	Diagonal armor	14	272.08	272.08				Completed.
	Barbettes, 13-inch B. L. R.†	17	774.80				774.80	Nov., 1894.
	Barbettes, 8-inch B. L. R.	6-8	153.73		153.73			Completed.
	Turrets, 13-inch B. L. R. †	15	358.21			358.21		Sept., 1895.
	Turrets, 8-inch B. L. R.†	6	141.56				141.56	Feb., 1895.
	Conning tower	10	40.64		40.64			Completed.
	Conning-tower tube	4	11.68		11.68			Do.
	Casemate armor	7	178.10		178.10			Do.
	Sponsons	2-4	45.15		45.15			Do.
	Ammunition tube	3	58.85	58.85				Do.
Massachusetts	Side armor †	18	613.56			613.56		Feb., 1895.
	Diagonal armor	14	268.63	268.63				Completed
	Barbettes, 13-inch B. L. R †	17	788.75	788.75				Do.
	Barbettes, 8-inch B. L. R.†	6-8	153.94		153.94			Do.
	Turrets, 13-inch B. L. R.†	15	358.21			358.21		May 1895.
	Turrets, 8-inch B. L. R.†	6	141.56		141.56			Completed.
	Conning tower	10	43.30			43.30		Jan., 1895.
	Conning-tower tube	7	11.93	11.93				Completed.
	Casemate armor	4	177.73		177.73			Do.
	Sponsons	2-4	41.07		41.07			Do.
	Ammunition tube	3	56.36			56.36		Jan., 1895.

* Harveyized; complete except 2 shutter plates.
† Harveyized.

Statement of armor contracts to October 1, 1894—Continued.

Vessel.	Description.	Thickness.	Amount required.	Amount delivered. Bethlehem.	Amount delivered. Carnegie.	Amount to be delivered. Bethlehem.	Amount to be delivered. Carnegie.	Probable date of delivery.
		Inches.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	
Texas	Side armor *	12	301.00			301.60		Nov. 15, 1894.
	Diagonal armor	8	27.90	27.90				Completed.
	Redoubt armor	12	397.37	397.37				Do.
	Turrets	12	208.99	208.99				Do.
	Conning tower	12	24.30			24.30		May, 1895.
	Armored tubes	9-6-2-1	27.52	27.52				Completed.
	Ammunition hoists	6	26.29	26.29				Do.
	Gun shields	2	10.01	10.01				Do.
Katahdin	Side armor	3-6	139.30		139.30			Do.
	Protective deck	2½-2-5½-6	533.68		533.68			Do.
	Conning tower	18	44.70				44.70	Oct., 1894.
	Smoke pipe	6	22.16		22.16			Completed.
	Ventilator	6	12.33		12.33			Do.
New York	Side armor	4	205.59		205.59			Do.
	Barbettes	10	124.02		124.02			Do.
	Turrets	5½	63.77		63.77			Do.
	Conning tower	7½	25.80		25.80			Do.
	Conning tower tube	5	10.38		10.38			Do.
	Sponsons	2-4	74.52		74.52			Do.
	Sighting tower	6	14.95		14.95			Do.
Brooklyn	Side armor *	3	171.16		171.16			Do.
	Barbettes *	4-8	145.00				145.00	Oct., 1894.
	Turrets	5½	135.50				135.50	June, 1895.
	Conning tower	8	28.00			28.00		Jan., 1895.
	Conning tower tube	5	13.00			13.00		Do.
	Sponsons	2-4	86.95		86.95			Completed.
	Splinter bulkheads	1½	37.15		37.15			Do.
	Ammunition tube	3	72.50			72.50		Jan., 1895.
Olympia	Barbettes	4½	48.98		48.98			Completed.
	Turrets *	3½	42.89		42.89			Do.
	Conning tower	5	21.39		21.39			Do.
	Conning tower tube		5.69		5.69			Do.
	Sponsons	2-4	81.89		81.89			Do.
	Ammunition tube	3	24.11		24.11			Do.
Columbia	Conning tower	5	21.97		21.97			Do.
	Conning tower tube	3	4.45		4.45			Do.
	Sponsons	2-4	50.13		50.13			Do.
Minneapolis	Conning tower	5	21.90		21.90			Do.
	Conning tower tube	3	4.46		4.46			Do.
	Sponsons	2-4	49.17		49.17			Do.
Cincinnati	do	4	46.81		46.81			Do.
Raleigh	do	4	46.98		46.98			Do.
Detroit	do	2½	22.08		22.08			Do.
Montgomery	do	2½	22.03		22.03			Do.
Marblehead	do	2½	20.41		20.41			Do.
Machias	do	2½	20.85		20.85			Do.
Castine	do	2½	20.99		20.99			Do.
Total			18,942.02	6,533.28	5,315.32	3,686.12	3,407.30	Sept., 1895.

* Harveyized

The state of progress of the 7,092.42 tons of armor still to be delivered is as follows:

Number of plates still required.	Forged or rolled.	Machined.	Bent.	Undergoing uniformity tests.	Awaiting ballistic test.	Accepted ballistically.	Carbonized.	Harveyized.	Finished machined.
* 70	67	56	56	34			49	36	7
† 107	82	19	19	13			3		
‡ 47	34	27	27	12		15			
§ 140	79	78	63	32	36	36			
364	262	180	165	91	36	51	52	36	7

* Bethlehem contract, June 1, 1887.
† Bethlehem contract, March 1, 1893.
‡ Carnegie contract, November 20, 1890.
§ Carnegie contract, February 28, 1893.

ARMOR DEVELOPMENT.

The efforts of the Government to develop the manufacture of armor in this country, constituting as it does an important aid to the national defense, has led to responsibilities being thrust upon the Department which in an established industry would be borne by the contractors.

In the specifications, therefore, minimum requirements have been set which are designed merely to exclude absolutely inferior or defective material; and all matters on which a sufficiently comprehensive experience had not been brought to bear were left in a position permitting an equitable settlement.

This was especially the case with regard to Harveyed armor, concerning which when made for service many minor difficulties were foreseen which could only be provided for as they arose.

The specifications enumerate the defects which experience has shown to be objectionable, also the approved steps in the manufacture which are known to produce the best results, as well as the physical characteristics which it would be impossible for inferior or unsuitable metal to exhibit. Following this, however, and constituting as it were a blanket test, was the ballistic trial intended to bring to light such defects, if any existed, as were not exposed by the previous tests.

This ballistic test formed an inferior limit of acceptance, and in no way was it to be regarded as a standard of excellence. All sound and homogeneous plates properly manufactured and otherwise satisfying the requirements were expected to have at least 15 per cent greater resistance than that demanded by this test. The results of 31 ballistic trials have justified this expectation; in the two cases where plates failed they were found to be either flawed or stressed through the irregular effect of a uniform treatment on a nonhomogeneous plate.

The specifications concede the difficulty a newly started industry would have in supplying material of great regularity of quality by accepting and paying for plates otherwise defective if they succeeded in passing the ballistic test. Evidently should the spirit of equity and a conscientious desire to do the best possible cease to exist on the part of the contractors, this concession may be made use of to invalidate all other tests, and to lower the standard of resistance 15 per cent below that which is required and paid for. The saving clause is that the contractors should use every endeavor and incur all the expense necessary to produce the most resisting plates. That this is done can only be determined by a rigid system of inspection.

The manufacture of armor now being thoroughly established, so that a great regularity in the quality of output may be expected, it is considered important that in future contracts the minimum requirements be raised to a point known possible to be attained by careful and skillful manufacture, the contractors still being pledged to produce the best armor possible under the conditions existing at the time of placing the contract.

The Harvey process at the date of the last report was quite generally regarded abroad as impracticable, on account of the distortion due to tempering, the difficulty in securing structures to the hardened face, and the possible destruction of thick plates by the development of strains in hardening. These anticipated difficulties have not been found to exist. From the experience at hand, it may be said that our armor-makers are now able to Harvey plates of any shape and thickness likely to be required, provided only that the original plate be sound and homogeneous.

The difficulties due to shrinkage in both cementation and hardening are becoming better understood, so that very few plates are furnished much exceeding in distortion the tolerances for oil-tempered plates. Whenever the distortion of a plate is such as to indicate the existence of a violent stress, or render it unsuitable for the purpose intended, a retreatment has been directed. A proper regard to the uniform composition and temperature of the plate, with suitable modifications of the tempering bath, will generally avoid this difficulty.

It has been found, however, that in bending and rectifying certain plates after carbonizing and before water-hardening, especially those which are thin and tend to cool quickly and irregularly, that the carbonized surface has not sufficient ductility to stretch with the softer back, and consequently cracks may be found in that surface. The temperatures between which a highly carbonized surface may be caused to stretch—without cracking on the one hand or fusion on the other—are much closer together than in the case of low carbon steel, so that it is very susceptible in working to superficial cracks formed by local cooling under stress. This tendency appears to be greatest in plates which possess the most efficient normal composition for Harveying.

Two Bethlehem and two Carnegie plates containing cracks of this description, wholly confined to the Harveyed surface, have been tested. The results seem parallel to those obtained in the numerous severe tests of the chill cracks found in the face of Grüson armor plates, indicating that a lack of continuity in the hardened face of an armor plate, supported by a tough and sound back, does not of itself reduce the ballistic resistance of the plate.

Experiments are, however, being continued in this direction, and one or more ballistic plates have been selected for test on account of these defects, which are not believed to be inseparable from the process.

The difficulties which were foreseen with regard to the drilling into or bolting to the faces of Harvey plates are in a fair way of being overcome. Ordinarily soft strips have been left on the faces of plates in the wake of structures required to be attached, but recent experiments made by the Bureau have demonstrated the feasibility of electric annealing. An apparatus for that purpose has been authorized by the Department to be placed in the hands of the William Cramp & Sons Ship and Engine Building Company, and in the future armor for ships being built by that firm will be Harveyed over the entire surface. A series of experiments had been previously made under the direction of the Bureau, both at Bethlehem and Homestead, by which it was demonstrated that bolt holes could be drilled and tapped either before carbonizing or before water hardening, and if they were properly protected from oxidation in the furnace, they would remain efficient after treatment. This method of procedure was found to be impracticable, for the reason that the shipbuilders could not indicate with sufficient closeness the position of all required bolt and rivet holes before the armor was fitted into place.

A satisfactory arrangement has been made with armor manufacturers whereby the Government will receive a rebate for the nickel belonging to it and contained in the armor-plate scrap and discards remaining in the contractors' hands on the completion of the contracts.

Objection has been made to the ballistic tests for thick Harveyed armor. These are claimed to be entirely too severe. The Bureau, while recognizing that the required tests are more severe for thick armor than for thin, is not convinced that it is necessary or desirable

4 1

DOES NOT CIRCULATE

guns.		3-pounder guns.		1
	D. S.			H
ess. Long.	Trunnion less, long.	Hotchkiss.	Driggs-Schroeder.	Light.
2	2			
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		2		2
		2		2
		2		
	1		2	
	12			
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		2		1
		4		2
	6			
8				
		4		2
	2	2		
	12			
		3		
		2		1
	4			
	4			
	4			
107	138	35	6	16

ARMAMENT OF NEW VESSELS.

ır the armaments of the *Columbia*, *Raleigh*, and *Cincin-*
ıstalled.
that the metacentric height of the *Detroit*, *Montgom-*
ıead was not sufficient to insure sufficient stability
ssary to reduce the battery weights of those vessels,
their forward 6-inch gun has been replaced by a 5-inch
ter 6-inch gun has been removed, so that their main
ıssist of nine 5-inch rapid-fire guns instead of eight 5-
ıch.
ıf the *Maine*, *Texas*, *Amphitrite*, *Puritan*, *Olympia*, and
: been completed and are being installed.
tables show the assignment thus far made of guns and
rn batteries:

SMALL ARMS.

' 6 mm. (0.236 inches) having been decided upon for
arm, as stated in the last report, the Bureau at once
: manufacture of experimental guns and ammunition
The general dimensions and characteristics of the
and bullets having been laid down, the Winchester
Company undertook to develop the ammunition, and
, after considerable tests of their own, supplied bullets
Bureau for test. In the meanwhile the Bureau had
er of different samples of steel for gun barrels and
the hands of the Pratt and Whitney Company for
ıufacture, and by the time ammunition was ready the
eady for testing it. The Small Arms Board was then
naval torpedo station for the purpose of testing barrels
, recommending a suitable charge of powder, length of
features, and to draw up a programme of tests of guns
ıe competitive trial proposed to be held prior to the
'stem for the Navy. The report of the board, which
the appendix, showed the ammunition and barrels to
:tory. With 36 grains of the powder used, rifleite, a
f 2,450 foot seconds at 60 feet from the muzzle was
maximum pressure of 40,000 pounds per square inch,
: and powder were adopted for use in the tests for
rrels and for the selection of a mechanism. The pro-
and requirements as drawn up by the board were also
Department, and was published under date of March
form of a "Notice to inventors and others who desire
arms to test for adoption for the naval service." This
'ound printed in the appendix.
ıf different steels were next finished and sent to the
ground at Indian Head for endurance tests and to
:ments of the trajectory. The reports of the tests there
nd in the appendix. From these reports it will be seen
narked A and M, respectively, stood the best, each being
:r 2,000 rounds. The material of the A barrel was steel,
t 4½ per cent nickel, and showing an elastic limit of
ınds per square inch, with an elongation in 2 inches of
. The material of the M barrel was a simple steel of

DOES NOT CIRCULATE

about 80,000 pounds elastic limit and 15 per cent elongation. The latter material, however, is practically unworkable on account of its hardness, while the former machines with great ease. Consequently the Bureau decided to adopt nickel steel for the gun barrels, and at once ordered fifty barrels made of this material for the use of inventors and others wishing to manufacture experimental arms for test. Of these barrels thirty-three have been purchased and presumably a considerable number of them will be presented for test at the date fixed for the meeting of the Small Arms Board. This date, originally August 1, 1894, has been fixed now as October 1, 1894, on account of numerous requests from inventors for delay.

MACHINE GUNS.

The pressing need for machine guns induced the Bureau to undertake the selection of a system without waiting for the manufacture and development of guns of 6 mm. caliber, it being thought that the 0.30-inch caliber guns available for test would illustrate in all necessary ways the behavior of the system tested when applied to a smaller caliber. Accordingly, on March 22 and May 2, 1894, the Department issued circulars calling for the submission to competitive test of machine guns of small caliber, using smokeless powder, and a board was appointed to conduct the tests and recommend a system of machine guns for the naval service. Two automatic single-barrel guns, the Maxim-Nordenfelt and the Skoda, and four hand-worked guns, the Gatling, Accles, Robertson, and Gardner, were submitted and thoroughly tested, but the board was unable to agree in all particulars as to the relative merits of these systems, the majority recommending the Maxim-Nordenfelt and the minority the Gatling gun. This fact, taken in consideration with the necessity of further extended trials with any system when applied to the new caliber, led the Bureau to recommend to the Department another competitive test of machine guns, with the condition that all shall be of 6 mm. caliber, and this has been approved. Consequently the final selection of a system of machine guns for the Navy has been postponed until new guns can be made and tested, which it is hoped will be in a short time. The report of the Machine Gun Board will be found in the appendix.

AUTOMOBILE TORPEDOES.

Howell.—Thirty torpedoes of this type were contracted for January 4, 1889, with the Hotchkiss Ordnance Company, and at this date twenty-three have been completed and presented for test. Two of this number have been accepted and twenty-one are undergoing running trials. It is expected that the remainder of the thirty torpedoes originally contracted for will be ready for test in the course of two or three weeks. These torpedoes continue to perform satisfactorily, and the Department has, in accordance with the provisions of the contract, increased the number of torpedoes to be supplied from thirty to fifty.

The first torpedoes manufactured for the Government having been otherwise disposed of by the company, an important improvement was made in the torpedo by increasing the explosive charge to 100 pounds and making the exercise and war heads of exactly the same weight, which insures a more efficient explosive and renders the exercise and war conditions of firing the same. All torpedoes to be supplied to the *Government* are of this type.

Whitehead.—The contract of May 19, 1891, with the E. W. Bliss Company for one hundred Whitehead torpedoes having been completed, the Department on May 12, 1894, entered into a further contract with this company for fifty Whitehead torpedoes of improved pattern, designated as Mark II, and at this date twenty torpedoes have been delivered on the latter contract and others are nearly ready for delivery.

TORPEDO-LAUNCHING APPARATUS.

Howell.—Of the sixteen launching tubes ordered of the Hotchkiss Ordnance Company for the Howell torpedoes, eight have been completed and installed as follows: Two in the *Stiletto* (one bow and one deck), one in the bow of, each, the *Raleigh*, the *Cincinnati*, the *Detroit*, the *Montgomery*, *Marblehead*, and the *Bancroft*.

Whitehead.—The whole of the launching apparatus ordered for this torpedo (consisting of 71 tubes, 53 mounts of different types, together with their appurtenances, 10 air compressors, type 2, 20 accumulators, and 1 small air compressor of special design) have been delivered.

The assignment of torpedoes and their appurtenances is as follows:

Torpedo outfit.

Name of vessel.	Number of torpedoes.		Tubes fixed.				Training tubes mounted.			
			Whitehead.		Howell.		Upper deck, broadside.			
							Whitehead.		Howell.	
	Whitehead.	Howell.	Bow.	Stern.	Bow.	Stern.	Forward.	Aft.	Forward.	Aft.
Bancroft	2	2			1					
Brooklyn		12			1					
Cincinnati	6	2		1	1					
Columbia	8									
Cushing	4		1							
Detroit	2	2			1		2			
Ericsson	4		1							
Indiana	14		1	1						
Iowa		14			1	1				
Maine	8									
Marblehead	2	2			1		2			
Massachusetts	14		1	1						
Minneapolis	8									
Montgomery	2	2			1		2			
New York	4		1							
Olympia	12		1	1						
Oregon	14		1	1						
Raleigh	4	2		1	1					
San Francisco	8									
Texas	8		1	1						
Gunboat No. 7	2		1							
Torpedo boat No. 3		4								
Torpedo boat No. 4		4								
Torpedo boat No. 5		4								
Total	126	50	9	7	8	1	6			

Torpedo outfit—Continued.

Name of vessel.	Training tubes, mounted.											
	Lower deck, broadside.				Central pivot turntable, deck mount, single tube.		Central pivot turntable, deck mount, twin tube.		Air compressor.		Accumulator.	
	Whitehead.		Howell.									
	Forward.	Aft.	Forward.	Aft.	Whitehead.	Howell.	Whitehead.	Howell	Number.	Type.	Number.	Type.
Bancroft	1								1	No. 11 Br.		
Brooklyn			2	2								
Cincinnati		2							1	No. 2 W.	1	
Columbia	2	2							2		2	No. 3
Cushing					2				1	No. x Br.		
Detroit									1	No. 2 W.	1	No. 2
Ericsson							1		1			
Indiana	2	2							2		2	No. 3
Iowa			2	2								
Maine	2	2	(*)						1	No. 2 W.	1	No. 3
Marblehead									1	No. 2 W.	1	No. 2
Massachusetts	2	2							2		2	No. 3
Minneapolis	2	2							1		1	No. 3
Montgomery									1	No. 2 W.	1	No. 2
New York	2								1	No. 2 W.	1	No. 3
Olympia	2	2							2	No. 2 W.	2	One No. 2 One No. 3
Oregon	2	2							2		2	No. 3
Raleigh		2							1	No. 2 W.	1	No. 3.
San Francisco	2	2							1	Bliss.	1	No. 3
Texas		2	(†)						1		1	No. 3
Gunboat No. 7									1			
Torpedo boat No. 3						3						
Torpedo boat No. 4						3						
Torpedo boat No. 5						3						
Total	19	22	4	4	2	9	1		24		20	

* Two third-class torpedo boats, each carrying one bow tube.
† Two third-class torpedo boats, each carrying one central pivot deck tube.

TORPEDO DEFENSE NETS.

The tests of torpedo defense nets referred to in the last annual report of the Bureau were discontinued in November last, because of the withdrawal by the owners of the steamer *Destroyer*. A report of the results obtained up to that date is appended. It is the intention of the Bureau to resume these tests as soon as proper facilities are available and the more pressing work will permit.

ADDITIONAL SUPPLY OF TORPEDOES.

The present allowance of torpedoes for each tube is, in the opinion of the Bureau, entirely too small, and for this reason an estimate of $242,500 is submitted for an additional supply of one hundred automobile torpedoes.

CUNNINGHAM ROCKET TORPEDO.

A further test of this torpedo was made at the naval torpedo station, Newport, R. I., on October 31 last, and a report of the result is appended. The Bureau has ordered two of these torpedoes, which are to be tested before payment is made for them, with the proviso that, if there should be a failure to ignite the charges, the company shall reload the cases as many times as may be necessary to secure the simultaneous burning of both rocket compositions, and shall defray all expenses incident thereto.

SUBMARINE BOAT.

In March, 1894, a board appointed by the Navy Department met to consider the design of a semisubmerged boat submitted by Mr. John P. Holland, of New York.

The board reported that, in its opinion, such a design was undesirable, being inferior to either a surface or a submerged boat and possessing no compensating advantages of any kind.

No contract for a submarine boat has yet been awarded under the Navy Department's circular of May 1, 1893. All reports thus far made on the subject of a submarine boat are hereto appended.

MAGAZINES.

The Bureau desires to renew in the strongest terms the recommendation made by the chief of Bureau in his annual report for 1890, that the naval magazine be removed from Craney Island.

The island lies at the western side of the entrance to the Elizabeth River, 4 miles below Norfolk, and the magazines would be entirely at the mercy of any vessel which had succeeded in running by the defenses at Fortress Monroe.

The military considerations are quite sufficient to demand its immediate removal, but for other reasons the site is as bad as possible. The wharf can only be approached by lighters through a channel a mile in length, which has to be kept open by dredging across the mud flats. Hundreds of tons of ammunition must be lightered, involving great delay and heavy expense, which would be avoided if the magazine were located where the depth of water permitted vessels to go to the wharf.

The island is low and alluvial, subject to partial overflow, and the sea wall, repaired in 1889 at an expense of $1,245, after the encroachments of the sea had endangered the foundations of the buildings, is reported as being rapidly destroyed.

A special appropriation would be necessary to put the sea wall in proper condition and to provide an increased water supply, which has become necessary, owing to the number of men employed in preparing ammunition for the new vessels.

The site of the magazine is a portion of the U. S. military reservation of Craney Island, set apart for the purpose by authority of an act of Congress in 1874. The buildings were erected at a cost of $39,278, and the sum of $20,435 has since been expended in various repairs.

Action in the matter of removal is urgently needed, and the Bureau has inserted an estimate for the necessary expense in the annual table of estimates.

Working drawings and specifications are being prepared for the repairs and improvements at the magazine, Mare Island, recommended in the last annual report, and for which an appropriation was made by the act of Congress approved July 26, 1894.

The tramways and wharf at the Chelsea magazine have been thoroughly repaired, and a contract has just been made for the repairs of those at the Fort Mifflin magazine; plans for a better water supply at the magazine near Dover, N. J., are under consideration.

BATTERIES FOR AUXILIARY CRUISERS.

The acts of Congress approved March 3, 1891, and May 10, 1892, provide that the steamers registered under the provisions of those acts may be taken and used by the United States as transports or cruisers. In case such vessels should be called into service, and it would be the first and most natural means of increasing our naval strength, it would require many months to provide batteries for them, and for this reason the Bureau recommends that a small appropriation for this purpose be made each year until sufficient guns and mounts have been provided to arm at least thirty-three of the most suitable steamers on the Atlantic coast and at least eight of the most suitable on the Pacific coast. This number of vessels would require in all 6 6-inch, 159 5-inch, 158 4-inch, and 377 secondary battery guns. To enable the Bureau to commence the manufacture during the next fiscal year of a portion of the guns enumerated above, an estimate of $500,000 is submitted.

INSTRUCTION OF ENLISTED MEN.

The instruction of enlisted men at the naval gun factory, Washton, D. C., and at the naval torpedo station, Newport, R, I., has continued during the year. For the year at the gun factory 76 seamen have been under instruction and 43 have qualified as seamen gunners. There are at this date 23 seamen there under instruction. The course of instruction at this place has not been changed in any essential particular. At the naval torpedo station 62 seamen have been under instruction, of whom 21 are now in attendance, 2 have been transferred to general service, not qualified, while 39 have been rated seamen gunners upon completion of their course. The period of instruction has been reduced to twenty-two weeks, which are allotted as follows: Eight weeks to torpedoes, seven weeks to electricity, four weeks to explosives, and three weeks to diving. The course of instruction at this place has been modified in essential particulars with the view to more fully adapting it to the present requirements of the service. The time hitherto devoted to acquiring a knowledge of spar torpedoes and the details of manufacture of explosives has been greatly reduced. The men are now taught the object and use of the various articles which compose the automobile torpedo outfits; the construction, care, and handling of the torpedoes, and their adjustment and preparation for action.

NAVAL TORPEDO STATION.

The naval torpedo station at Newport, R. I., has remained under the charge of Commander George A. Converse, U. S. Navy.

Certain necessary repairs to the wharves, buildings, and to the storehouses have been made, and several changes have been made in the various workshops and laboratories, principally with a view to greater convenience in the execution of the work carried on therein, and for the purpose of lessening liabilities to fires from accidental causes. The work of rebuilding the gun cotton factory is progressing satisfactorily. Nearly all the machinery required for the operation of the factory has

been ordered and deliveries commenced, and the work of installing it will be pushed as rapidly as possible.

The interesting report of the inspector of ordnance in charge of this station is appended.

NAVAL GUN FACTORY.

The naval gun factory is still under the direction of Commander Theo. F. Jewell, U. S. Navy, whose interesting report of the operations of that establishment during the past year will be found appended. The principal work has been, as heretofore, the manufacture of guns and mounts, but a vast amount of miscellaneous work has been carried on. The manufacture of guns for all vessels thus far authorized is rapidly approaching completion, and, in order that this portion of the plant (the gun shop) may be kept in active operation, it is urged that the appropriation for reserve guns and for guns necessary to arm the auxiliary cruisers mentioned elsewhere in this report may be made at the coming session of Congress.

NAVAL PROVING GROUND.

The naval proving ground has remained under the supervision of Lieut. N. E. Mason, U. S. Navy, whose report of the work done and improvements made at the station during the year is appended. The necessity of a better water supply and for suitable buildings for magazine and filling houses at this station is fully explained in Lieut. Mason's report, and the Bureau earnestly requests that an appropriation of $20,000 for that purpose may be made.

OFFICERS PERFORMING ORDNANCE DUTY.

The following are the officers of the Navy employed under this Bureau, with their respective stations and duties:

Name and station.	Duties.
BUREAU OF ORDNANCE.	
Commander C. S. Sperry	Submarine boats, powder, and range finders.
Lieut. Henry McCrea	Ships' allowances and Bureau library.
Lieut. A. A. Ackerman	Armor and gun-carriage castings.
Ensign F. L. Chapin	Member of board on torpedoes and torpedo boats, and in charge of all matters pertaining to torpedo outfits of vessels.
Ensign Joseph Strauss	In charge of development of engineering and construction of turret mounts.
Ensign Philip Andrews	All main battery mounts other than those for turrets; secondary battery mounts, ships' magazines, stowage and supply of ammunition.
Prof. P. R. Alger	Marine artillery construction and gun steel.
WASHINGTON NAVY-YARD.	
Commander Theo. F. Jewell	Superintendent naval gun factory.
Lieut. Commander E. H. C. Leutze	General duty in shops; installation of machinery; making target backings, and all outside work.
Lieut. Commander Andrew Dunlap	Senior member of Board of Inspection and miscellaneous duties.
Lieut. G. Blocklinger	Powder tanks, pattern loft, work for naval proving ground, and miscellaneous work.
Lieut. Herbert Winslow	10-inch guns and mounts, ammunition hoists, other than those for 12 and 13 inch guns.
Lieut. R. M. Potts	12 and 13 inch guns and mounts.
Lieut. Albert Gleaves	6-inch guns and mounts, torpedo launching apparatus, etc.
Lieut. W. L. Rodgers	8-inch guns and mounts; pressure gauges.
Lieut. J. H. L. Holcombe	Secondary battery mounts; projectiles; fuses.
Lieut. Stokeley Morgan	5-inch guns and mounts; electrical work; electric firing attachments; primers.
Ensign B. C. Decker	4-inch guns and mounts; gun locks.

Name and station.	Duties.
WASHINGTON NAVY-YARD—continued.	
Gunner William Walsh	In charge of manufacture of miscellaneous articles, and of packing and shipping manufactured articles.
Gunner F. C. Messenger	In charge of the naval magazine at Bellevue, and assists in instruction of seamen.
NAVY-YARD, NORFOLK, VA.	
Lieut. Commander C. C. Todd	Inspector of ordnance.
Gunner John Gaskins	On duty at St. Helena and yard, guarding public property.
Gunner W. W. Carter	On duty at Craney Island magazine, preparing, receiving, and overhauling ammunition, and guarding public property.
NAVY-YARD, LEAGUE ISLAND, PA.	
Lieut. Commander S. W. Very	Inspector of ordnance, in general charge of ordnance duties at League Island navy-yard, at the naval magazine, Fort Mifflin; at Cramps' shipyard, at Cramps' gunworks, and at Cramps' proving ground.
Ensign J. G. Doyle	Assistant inspector of ordnance, assigned to duty at Cramps' shipyard.
Gunner C. H. Venable	In charge of naval magazine at Fort Mifflin, Pa.
Gunner Francis Martin	Assistant to inspector of ordnance at League Island navy-yard.
NAVY-YARD, NEW YORK, N. Y.	
Commander Horace Elmer	Inspector of ordnance.
Lieut. G. C. Hanus	Assistant inspector of ordnance. Installation of automobile torpedo tubes, main batteries up to 8-inch guns, secondary batteries, range finders, and inspection of magazines on shore.
Lieut. Henry Morrell	Assistant inspector of ordnance. Installation of turret mounts, ammunition hoists, magazines, and shell rooms on board ships; general inspection duty.
Gunner Joseph Swift	In charge at naval magazine, Fort Wadsworth, Staten Island, preparing ammunition.
Gunner James Hayes	In charge at ordnance dock, navy-yard.
Gunner Cornelius Dugan	In charge of naval powder depot, near Dover, N. J.
Gunner Frank H. Whitney	In charge of gunners' division, navy-yard.
NAVY-YARD, BOSTON, MASS.	
Commander Charles J. Barclay	Inspector of ordnance.
Gunner George Fouse	In charge of magazine, Chelsea, Mass.
Gunner Samuel Cross	In charge niter depot, Malden, Mass.
NAVY-YARD, PORTSMOUTH, N. H.	
Commander E. W. Watson	Inspector of ordnance.
Gunner A. A. Phelps	On duty in yard.
NAVY-YARD, MARE ISLAND, CAL.	
Lieut. Commander F. M. Symonds	Inspector of ordnance.
Ensign G. R. Slocum	Assistant to inspector of ordnance
Gunner William Halford	In charge of naval magazines.
Acting Gunner H. J. Tresselt	On duty at yard.
NAVAL TORPEDO STATION.	
Commander G. A. Converse	Inspector of ordnance; in charge of station.
Lieut. Commander Duncan Kennedy	Charge of electrical laboratory, dynamo room, and experimental electrical work; instructor in electricity.
Lieut. G. F. W. Holman	Charge of torpedo assembling room; inspector of outfits, magazines, and manufactured explosives; instruction in practical torpedo work.
Lieut. Roy C. Smith	Charge of preparation for general experiments; immediate charge of *Stiletto;* member of torpedo board.
Lieut. J. B. Bernadou	In charge of manufacture of high explosives and smokeless powders.
Lieut. E. E. Capehart	Charge of manufacture of fuses, primers, etc.; instructor in diving; assistant instructor in practical torpedo work.
Gunner James Shannon	Assistant to inspector of outfits, magazines, etc.
NAVAL PROVING GROUND.	
Lieut. Newton E. Mason	Inspector of ordnance; in charge of station.
Ensign R. D. Tisdale	Assistant inspector of ordnance; in charge of powder, pressure gauges, etc; observer at chronograph.
Ensign F. W. Jenkins	Assistant inspector of ordnance; in charge of armor plate, guns, and experimental work; assists in powder work; observer at chronograph.
Ensign M. L. Miller	In charge of gun mounts, and assists at chronographs and electric circuits; observer at chronograph.
Gunner P. C. Hanley	In charge of crane; handling guns and ordnance material; general supervisor of labor around batteries.

Name and station.	Duties.
PRIVATE WORKS.	
Commander Frank Courtis	Inspector of ordnance; in charge of the manufacture of armor at the works of the Carnegie Steel Company, Pittsburg, Pa.; also of armor-piercing shell at the works of the Sterling Steel Company, Denimler, Pa., and of rubber washers for armor bolts at the works of the B. F. Goodrich Company, Akron, Ohio.
Lieut. F. A. Wilner	Assistant to above.
Lieut. Joseph Beale	Do.
Ensign John P. McGuinness	Do.
Ensign William L. Howard	Do.
Lieut. John Hubbard	Inspector of ordnance at the works of E. W. Bliss Company, Brooklyn, N. Y., of Whitehead torpedoes.
Lieut. H. M. Dombaugh	Assistant to above.
Lieut. Karl Rohrer	Inspector of ordnance; in charge of the manufacture of armor and gun steel at the works of the Bethlehem Iron Company, South Bethlehem, Pa.; also of armor-piercing shell at the works of the Carpenter Steel Company, Reading, Pa., and of steel common shell at the works of the Taylor Iron and Steel Company, High Bridge, N. J.
Ensign William H. Faust	Assistant to above.
Gunner J. J. Walsh	Do.
Lieut. J. H. Oliver	Member of board on torpedoes and torpedo boats, also inspector of ordnance; in charge of the manufacture of the Howell torpedoes at the works of the Hotchkiss Ordnance Company, Providence, R. I.
Lieut. W. I. Chambers	Inspector of ordnance; in charge of the manufacture of gun steel and gun-carriage castings, as follows: Midvale Steel Company, Philadelphia, Pa.; Standard Steel Works, Thurlow, Pa.; Penn Steel Casting and Machine Company, Chester, Pa.; Eureka Steel Casting Company, Chester, Pa.; Norristown Steel Company, Norristown, Pa.; B. Atha and Illingworth Company, Newark, N. J.
Ensign A. C. Dieffenbach	Inspector of ordnance; in charge of the manufacture of rapid fire and machine guns and their ammunition and of small arms and their ammunition, at the works of Pratt & Whitney, Pratt & Cady, Colts' Fire Arms Company, Hartford, Conn.; Union Metallic Cartridge Company, Bridgeport, Conn.; Winchester Repeating Arms Company, New Haven, Conn.; American Projectile Company, Lynn, Mass.; Simonds Rolling Machine Company, Fitchburg, Mass.
Ensign N. A. McCully	Under instructions with view to relieving Ensign Dieffenbach.

The below-mentioned statements and reports are appended, viz:

A. Statement showing the amount appropriated under each specific head of appropriation for the service of the Bureau of Ordnance during the fiscal year ending June 30, 1894, expenditures during the same period, and balance remaining on hand June 30, 1894.

B. Statement of the number of days' labor and cost thereof from July 1, 1893, to June 30, 1894, at the respective navy-yards and stations, chargeable to the Bureau of Ordnance.

C. Amounts expended during the fiscal year ending June 30, 1894, from the appropriations under the Bureau of Ordnance for civilians employed on clerical duty or in any other capacity than as ordinary mechanics and workingmen.

D. Abstract of offers for furnishing supplies or services, and which were contracted for by the Bureau of Ordnance during the fiscal year ending June 30, 1894, and contracts awarded thereon.

E. Detailed estimates for fiscal year ending June 30, 1896.

1. Annual report of the superintendent of the naval gun factory.
2. Annual report of the inspector of ordnance, naval torpedo station, Newport, R. I.
3. Annual report of the inspector of ordnance, Hartford, Conn.
4. Annual report of inspector of ordnance, naval proving ground, Indian Head, Md.
5. Various reports on the subject of a submarine boat.
6. Report of the competitive trial of 6-pounder rapid-fire guns.
7. Report of the competitive trial of machine guns.
8. Various reports on the subject of a new small arm for the Navy.

Very respectfully,

W. T. SAMPSON,
Chief of Bureau of Ordnance.

The SECRETARY OF THE NAVY.

A.—*Statement showing the amount appropriated under each specific head of appropriation for the service of the Bureau of Ordnance during the fiscal year ending June 30, 1894, expenditures during the same period, and balance remaining on hand June 30, 1894.*

Appropriation.	Appropriated.	Expended.	Balance June 30, 1894.
Ordnance	$200,000.00	$128,398.86	$71,601.14
Repairs	30,000.00	21,882.04	8,117.96
Civil establishment	26,824.00	26,542.50	281.50
Contingent	8,000.00	6,224.68	1,775.32
Torpedo station	60,000.00	56,629.73	3,370.27
Total	324,824.00	239,677.81	85,146.19

The amounts expended were:

For labor	$172,655.18
For material, etc	67,002.63

The balances remaining are all needed to meet outstanding obligations, except that under "Civil establishment."

The above statement does not embrace continuous appropriations for the new ships or for special objects.

B.—*Statement of the number of days labor and cost thereof from July 1, 1893, to June 30, 1894, at the respective navy-yards and stations, chargeable to the Bureau of Ordnance.*

Navy-yard.	Number of days.	Cost.
Portsmouth	1,336	$3,282.50
Boston	1,377	2,428.80
New York	27,724	76,080.83
League Island	4,491	8,870.00
Washington	311,983	775,177.90
Norfolk	11,282	22,599.95
Pensacola	396	563.68
Mare Island	7,413	21,587.75
Key West	31	75.00
Port Royal, S C	25	27.63
Annapolis, Md	365	720.00
Naval proving ground, Indian Head, Md	35,961	52,257.19
Naval torpedo station	25,835	63,665.50
Total	428,219	1,028,536.73

Includes labor on outfits for new ships and under appropriations for special objects.

C.—*Amount expended during the fiscal year ending June 30, 1894, from the appropriations under the Bureau of Ordnance for civilians employed on clerical duty or in any other capacity than as ordinary mechanics and workingmen.*

Navy-yard.	Rating.	Amount paid.
Portsmouth	1 writer (6 months)	$500.00
New York	1 clerk	1,400.00
	1 assistant expert in steel (Bethlehem Iron Works)	1,530.00
	1 writer, Pittsburg, Pa	951.00
	1 copyist	169.52
Washington	1 clerk	1,600.00
	1 clerk	62.46
	1 clerk	1,078.36
	1 writer	1,017.25
	1 writer	326.08
	1 writer	691.17
	1 telegraph operator and copyist	900.00
	1 copyist	63.13
	1 copyist	656.87
	1 copyist	461.59
	1 copyist	251.21
	1 draftsman	1,573.15
	1 draftsman	941.80
	1 draftsman	1,081.00

C.—*Amount expended during the fiscal year ending June 30, 1894, etc.*—Continued.

Navy yard.	Rating.	Amount paid.
Washington	1 draftsman	$1,081.60
	1 assistant draftsman	696.91
	1 foreman	1,500.00
	1 foreman	1,500.00
	1 draftsman	1,427.28
	1 draftsman	1,339.50
	1 draftsman	1,125.90
	1 draftsman	667.80
	1 draftsman	1,048.05
	1 draftsman	1,092.60
	1 draftsman	1,084.45
	1 draftsman	1,092.60
	1 draftsman	1,081.80
	1 draftsman	730.80
	1 draftsman	1,126.80
	1 draftsman	1,078.20
	1 draftsman	930.54
	1 draftsman	784.78
	1 draftsman	602.16
	1 draftsman	327.60
	1 draftsman	31.20
	1 draftsman	3.12
	1 draftsman	3.12
	1 draftsman	10.92
	1 draftsman	330.72
	1 draftsman	329.16
	1 assistant draftsman	204.75
	1 writer	24.00
	1 writer	788.00
	1 writer	1,242.88
	1 writer	1,015.00
	1 writer	844.86
	1 writer	903.00
	1 writer	1,098.09
	1 writer	300.00
	1 copyist	1,020.38
	1 copyist	873.68
	1 copyist	1,020.38
	1 copyist	1,020.38
	1 copyist	257.54
	1 stenographer and typewriter	729.38
	1 chemist	2,006.39
Norfolk	1 clerk	1,200.00
	1 draftsman	413.28
Mare Island	1 writer	1,017.25
	1 draftsman	308.84
Naval proving ground	1 writer	1,017.25
Naval torpedo station	1 clerk	1,200.00
	1 chemist	2,500.00
	1 draftsman	1,500.00
	1 draftsman	1,236.24
Total		60,023.17

D.—*Abstract of offers for furnishing supplies or services, and which were contracted for by the Bureau of Ordnance during the fiscal year ending June 30, 1894, and contracts awarded thereon.*

Naval magazine grounds, Chelsea, Mass. (Advertisement dated March 12, 1894.

Repairs to tramway and footwalk:

William L. Miller	$1,147.00
William H. Gore	2,089.87
H. Gore & Co.	2,450.00
Andrew Carberry	2,405.00
Pickering & Walker	* 974.00

* Accepted. Contract dated April 27, 1894.

E.—*Estimates of appropriations required for the service of the fiscal year, ending June 30, 1896, by the Bureau of Ordnance, Navy Department.*

Detailed objects of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.			
Chief clerk (July 31, 1894, R. S., p. 70, sec. 416)	$1,800.00		
Draftsman (same acts)	1,800.00		
One assistant draftsman (July 11, 1888, vol. 25, p. 283, sec. 1; July 31, 1894)	1,400.00		
One clerk of class 3 (July 31, 1894, R. S., p. 27, sec. 167)	1,600.00		
One clerk of class 2 (same acts)	1,400.00		
One clerk of class 1 (same acts)	1,200.00		
One clerk (same acts)	1,000.00		
One copyist (same acts)	900.00		
One assistant messenger (same acts)	720.00		
One laborer (same acts)	660.00		
		$12,480.00	$12,480.00
ORDNANCE AND ORDNANCE STORES.			
For procuring, producing, preserving, and handling ordnance material; for the armament of ships; for fuel, material, and labor to be used in the general work of the Ordnance Department; for furniture at magazines, at the ordnance dock, New York, and at the naval ordnance proving ground (appropriated act July 26, 1894)	180,000.00		
Expenses of target practice (appropriated act July 26, 1894)	15,000.00		
Maintenance of new proving ground (appropriated act July 26, 1894)	5,000.00		
Modern battery for the *Hartford* (submitted)	150,000.00		
Reserve supply of guns for ships of the Navy (submitted)	159,558.50		
Reserve supply of projectiles for ships of the Navy (submitted)	130,000.00		
Additional supply of torpedoes (submitted)	242,500.00		
		882,058.50	200,000.00
REPAIRS, BUREAU OF ORDNANCE.			
For necessary repairs to ordnance buildings, magazines, gun parks, boats, lighters, wharves, machinery, and other objects of the like character (appropriated act July 26, 1894)		30,000.00	30,000.00
MAGAZINE, CRANEY ISLAND.			
For removal of magazine at Craney Island, in the harbor of Norfolk, to a more suitable and safe locality (submitted)		75,000.00	
NOTE.—The present site has become untenable through the advance of the sea, and is no longer suitable for the purposes of a magazine.			
TORPEDO STATION, BUREAU OF ORDNANCE, NEWPORT, R. I.			
For labor, material, freight, and express charges; general care of and repairs to grounds, buildings, and wharves; boats; instruction; instruments; tools; furniture; experiments; and general torpedo outfits (appropriated act of July 26, 1894)		60,000.00	60,000.00
RESERVE GUNS FOR AUXILIARY CRUISERS.			
Towards the armament of modern guns for auxiliary cruisers mentioned in the act approved March 3, 1891, and in section 4 of the act approved May 10, 1892 (submitted)		500,000.00	
CONTINGENT, BUREAU OF ORDNANCE.			
For miscellaneous items, viz: Freight to foreign and home stations; advertising; cartage and express charges; repairs to fire engines; gas and water pipes; gas and water tax at magazines; tolls, ferriage, foreign postage, and telegrams to and from the Bureau; technical books; and incidental expenses attending inspections of ordnance material (appropriated act July 26, 1894)		8,000.00	8,000.00

E.—*Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, etc.*—Cont'd.

Detailed object of expenditure, and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
NAVAL MILITIA.			
For arms and equipments connected therewith, and for the printing of necessary books of instruction for naval militia of various States, under such regulations as the Secretary of the Navy may prescribe (appropriated act July 26, 1894)		$25,000.00	$25,000.00
NAVAL PROVING GROUND.			
For buildings for magazine, for high explosives, and filling house; sewerage, extension of railroad track, water supply, etc. (submitted)		20,000.00	
CIVIL ESTABLISHMENT, BUREAU OF ORDNANCE.			
Navy-yard, Portsmouth, N. H.:			
One writer, when required (appropriated act of July 26, 1894)	$500.00		
Navy-yard, Boston, Mass.:			
One writer, when required (appropriated act July 26, 1894)	500.00		
Navy-yard, New York:			
One clerk (appropriated act of July 26, 1894)	1,400.00		
Navy-yard, Washington, D. C.:			
One clerk (appropriated act of July 26, 1894)	1,600.00		
One clerk (appropriated act of July 26, 1894)	1,200.00		
Two writers, at $1,017.25 each (appropriated act of July 26, 1894)	2,034.50		
One draftsman (appropriated act of July 26, 1894)	1,800.00		
Three draftsmen, at $1,081 each (appropriated act of July 26, 1894)	3,243.00		
One assistant draftsman (appropriated act of July 26, 1894)	772.00		
Two foremen, at $1,500 each (appropriated act of July 26, 1894)	3,000.00		
Two copyists, at $720 each (appropriated act of July 26, 1894)	1,440.00		
One telegraph operator and copyist (appropriated act of July 26, 1894)	900.00		
Navy-yard, Norfolk, Va.:			
One clerk (appropriated act of July 26, 1894)	1,200.00		
Navy-yard, Mare Island, Cal.:			
One writer (appropriated act of July 26, 1894)	1,017.25		
Naval ordnance proving ground:			
One writer (appropriated act of July 26, 1894)	1,017.25		
Naval torpedo station, Newport, R. I.:			
One chemist (appropriated act of July 26, 1894)	2,500.00		
One clerk (appropriated act of July 26, 1894)	1,200.00		
One draftsman (appropriated act of July 26, 1894)	1,500.00		
		26,824.00	26,824.00
INCREASE OF THE NAVY, ARMOR AND ARMAMENT.			
Toward the armament and armor, of domestic manufacture, for the vessels authorized by the act of Aug. 3, 1886; of the vessels authorized by the act approved Mar. 2, 1889; of those authorized by the act of June 30, 1890; of the one authorized by the act of Mar. 2, 1891; of those authorized by the act of July 19, 1892, and of the vessels authorized by the act of Mar. 3, 1893, and of the three torpedo boats act of July 26, 1894 (appropriated act of July 26, 1894)		5,237,670.00	4,000,000.00
NOTE.—The estimates for the current fiscal year (1894–'95) under this head were $6,500,000, but an appropriation of only $4,000,000 was made. It will be necessary, therefore, to make $2,500,000 of the amount now estimated for immediately available.			

Respectfully submitted.

W. T. SAMPSON,
Chief of Bureau of Ordnance.

SEPTEMBER 1, 1894.

No. 1.

ANNUAL REPORT OF THE SUPERINTENDENT OF THE NAVAL GUN FACTORY.

U. S. NAVY-YARD,
Washington, D. C., September 18, 1894.

SIR: I have the honor to report as follows on the progress of the work in the gun factory during the past year:

GUNS.

Thirteen-inch B. L. R.—At the date of the report of last year, September 25, 1893, two guns had been completed, with the exception of their breech mechanisms, and three others had been assembled.

Ten guns in all have now been completed; the eleventh gun is nearly completed and is now being rifled, and gun No. 12, the last of the lot authorized, has been completely assembled.

Breech mechanisms have been fitted to three guns, and the fitting of two others is nearly done. The manufacture of the mechanisms for the remaining guns is well advanced, and they can be placed on the guns at the rate of one every two months.

The breech mechanism fitted to these guns is without the customary hinge plate; it is comparatively light and works easily. Two men can open the breech and close it again in thirty seconds.

One gun has been proved at the proving ground with entirely satisfactory results. This was gun No. 2, in which the jacket stuck in assembling. Two other guns are ready for the proving ground.

The forward gas-check disc of this gun has been much improved by enlarging its inner diameter and fitting it to a shoulder on the rear face of the mushroom. It is probable that this disc may be still further improved by making it in the form of a split ring. A set is now being made for trial, discs of this form having given very satisfactory results in an 8-inch gun.

Twelve-inch B. L. R.—All of the completed guns of this caliber have been fitted with breech mechanisms. Three guns are yet to be proved.

Of the six guns now on hand, two will go to the *Texas* and the remaining four to the *Puritan*.

A slight change has been made in the profile of the compression slope of such of these guns (as well as in the 8-inch, 10-inch, and 13-inch guns) as had not already been proved.

Forgings for five (Mark II) guns of this caliber have been ordered from the Bethlehem Iron Company, four of which are for the battle ship *Iowa*. One complete set of these forgings has been received and the jacket and tube have been assembled. Portions of the other four sets have also been received.

Ten-inch B. L. R.—Of the twenty-five 10-inch guns completed, ten have been issued to service, three are ready for issue, assigned to the

Maine, and another (also assigned to the *Maine*) is in use at th lehem Iron Company in testing armor plates.

The remaining eleven guns of this caliber are to be fitted w lighter breech mechanism (Mark V) referred to in the report year. Two of these have already been fitted; the remaining nin anisms are well advanced and all will be completed within six r provided the necessary castings are received within a reasonab

Five of these guns are yet to be proved. Three are unassign

Eight-inch B. L. R.—At the date of the last report there wer shops twelve completed guns (ten of them being without breecl anisms) and eighteen guns in various stages of completion, o guns in all.

Breech mechanisms have been fitted to the ten completed gun fitted last year.

Six of these guns have been assigned, one each (40 caliber *Columbia* and *Minneapolis*, and four (35 caliber) to the *Olympia*. are the first guns of this caliber fitted with the Fletcher breecl anism.

Of the remaining completed guns, five have been fitted wit nions and the sixth has the screw thread chased for trunnion: trunnions are, however, to be removed and the guns fitted w sleeve for mounting in a spring-return mount.

The eighteen guns partially completed last year have been c assembled, bored, and chambered; seven of them have been rifl all have been turned outside except in the wake of the sleeve work was postponed until the design of the sleeve was definit tled. The thread for the sleeve is now being chased on one of th work on the mount being in progress.

A new form of gas-check disc has been successfully tested now being fitted to these guns.

Forgings for sixteen guns of this caliber have been ordered f Midvale Steel Company, most of which have been delivered. A many of these forgings have developed, during machining, sp flaws due apparently to sand or slag in the ingot. In the hoc ings the spots are generally circular, varying in diameter from p 0.02 or 0.03 inch. In the longer forgings the flaws take the splits, some being so fine and short as to be observed with di while others are from one-fourth to one-half inch in length. Th have usually very little depth, but they seem to be distributed tl out the mass of the forgings, so that while those observed on with a tool will disappear at the next cut another lot will The number of these flaws varies in different pieces, but eve which are apparently sound are discredited by the others, an question whether the whole lot should not be rejected. None o forgings have been assembled.

The inner jacket and tube of the nickel-steel gun have been bled by means of the furnace designed by Mr. William Sellers, a of which has been made.

The 8-inch 50-caliber gun, designed by Mr. H. P. Hurst, ha completed and rifled. The breech mechanism is now being fitte

Six-inch B. L. R.—Twelve 40-caliber 6-inch guns were in prog the date of the last report, six being of Mark III and six of M type.

Four of the Mark III guns have been entirely completed an with the service-breech mechanisms; the other two are near pleted, and are to be fitted as rapid-fire guns. Two of the M

guns have been completed. These have been chambered for metallic ammunition. One of them has been fitted with a Dashiell breech mechanism and the other with a rapid-fire mechanism designed by Lieut. F. F. Fletcher, U. S. Navy. The guns are now at the proving ground.

Three others of the Mark IV guns are nearly completed. The remaining gun is only partly assembled, owing to the D hoop having "shrunk off" 0.25 inch in assembling. This hoop will be put in place by means of the Sellers furnace.

These four guns will be fitted for metallic ammunition, the type of breech mechanism depending upon the results of the trials of the guns already fitted.

Five-inch B. L. R.—Twenty-seven 5-inch guns were completed during the year, making the total number of 40-caliber guns completed fifty-eight. Of this number, fifty-four have been issued to service. These guns are all of rapid-fire type, and are fitted with the Dashiell breech mechanism.

Four of the guns above mentioned are from the last lot of thirty forgings furnished by the Bethlehem Iron Company; they have not yet been proved. The remaining twenty-six guns have been assembled.

The work on the exterior of the twenty-six guns last mentioned has been deferred pending the consideration of a new type of mount, the adoption of which will make a slight change in the form of the gun body.

A few minor changes have been made in the breech mechanism of these guns as the work has progressed. The most important of these is the positive-action tray-latch, which has now been applied to all the rapid-fire guns. The adoption of an electric firing attachment has necessitated a slight change in the form of the hand lever.

A new form of trigger box, by Lieut. Gibbons, intended to give a direct pull with a short laniard, is now being experimented with.

A new pattern for the combined plug-tray and carrier-ring has been adopted and will be fitted to the guns hereafter completed. The new tray gives a better bearing for the translating arm-pin, and will require considerably less hand work in finishing.

Four-inch B. L. R.—At the date of the last report there had been completed, in all, fifty 4-inch guns. Four of these are fitted with the ordinary type of breech mechanism and two with the Driggs-Schroeder breech mechanism.

During the year seventeen guns of this caliber have been completed, making sixty-seven guns completed from forgings received prior to the last order.

In June, 1893, the Bureau contracted with the Midvale Steel Company for forty sets of forgings, all of which have been delivered. A very large proportion of these forgings have proved defective, the defects being entirely similar to those in the 8-inch forgings above referred to. Fourteen of these guns had been completely assembled before the defects in them developed, and the forgings of the other sixteen have all had more or less work done upon them. By direction of the Bureau one of the guns has been completed and sent to the proving ground for trial. Work has been suspended on the remainder.

All 4-inch guns after No. 6 have been fitted with the Dashiell breech mechanism, and all except those of the *Bancroft* now have the positive action tray-latch, the guns of the *New York* and *Machias* having been so fitted during the year. The new tray-latch is so great an improvement on the former one that it should be fitted to the *Bancroft's* guns as soon as that vessel becomes available.

All parts of these mechanisms are made to gauges and templets, so that they shall be interchangeable. The interchangeability of parts was tested during the year by actually placing on six guns mechanisms assembled from the parts belonging to other guns, no single mechanism thus assembled having more than two parts actually made for it. A similar experiment was made with 5-inch mechanisms. In every case the mechanism worked as though intended for the gun to which it was applied. This severe test was a very creditable showing for the accuracy of the work in the breech-mechanism shop, the experiments having been entirely unexpected by the workmen in the shop.

Six-pounder guns.—Six 6-pounder guns have been manufactured, four for the Naval Academy and two for the naval training station. These are fitted with the Driggs-Schroeder breech mechanism and mounted on field carriages.

B. L. R. guns manufactured and in process of manufacture at the naval gun factory.

	13-inch, 35 calibers.	12-inch, 35 calibers.	10-inch.		8-inch.			6-inch.			5-inch.		4-inch, 40 calibers.	8-inch.	
			30-calibers.	35 calibers.	30 calibers.	35 calibers.	40 calibers.	30 calibers.	35 calibers.	40 calibers.	30 calibers.	40 calibers.		Hurst, 50 calibers.	Nickel-steel.
Completed Sept. 15, 1893	2	8	2	23	5	26	2	123	6	0	2	31	50	0	0
Completed since that date	8	0	0	0	0	0	0	0	0	6	0	27	18	1	0
Total completed	10	8	2	23	5	*26	2	123	6	6	2	58	68	1	0
Assembled and nearly completed	2	0	0	0	....	18	0	0	0	5	0	26	13	0	0
Partly assembled	0	1	0	0	....	0	0	0	0	1	0	0	7	0	1
In hand	0	4	0	0	....	16	0	0	0	0	0	0	19	0	0
Total made and in progress	12	13	2	23	5	60	2	123	6	12	2	84	107	1	1

* Six of these to be altered.

MOUNTS.

Thirteen-inch turret mounts.—The 13-inch mount, which was nearly completed last year, has since been completed and is now in use at the proving ground. The mount proper has proved entirely satisfactory, but experience with it has shown that, while the hydraulic piping was sufficiently strong to stand the pressure for which it was intended when steadily applied, it was not strong enough to stand the hammering effect produced by pumping the water through a long supply pipe. This experience has resulted in the adoption of heavier piping for all hydraulic mounts.

A large portion of the castings for the twelve mounts for the battle ships, which were ordered about the date of the last report, have been delivered; and work on four of these has progressed very satisfactorily. One of these mounts will soon be erected, and the four (intended for the *Indiana*) should be completed by July 1, 1895.

Twelve-inch turret mounts.—One of the *Puritan's* mounts has been proved and shipped. The second mount of this pair is now ready to go to the proving ground, and will be sent as soon as the *Texas's* mount is returned. All the piping has been fitted to this mount, and it can be shipped immediately after its return from proof. The third mount (the first of the second pair) has been returned from the proving ground, and is now being erected for fitting the piping. The fourth mount is being assembled. All can be shipped by December 1.

One of the *Texas's* mounts has been set up and tested in the gun shop and has been sent to the proving ground. If it is successful in proof the second mount (now nearly assembled and piping fitted) can be shipped within one month. The other can be shipped in six weeks after its return from the proving ground.

Designs have been made for a spring-return mount to be worked by hand for the four guns of the *Iowa*. The detail drawings are in progress.

Ten-inch turret mounts.—Two mounts for the *Maine* have been shipped. The others have been proved and the piping (which has been renewed) will be completed about October 15, 1894. The mounts can be shipped about November 1, 1894.

Two of the *Amphitrite's* mounts have been shipped. The other two can be shipped about November 1.

The four mounts for the *Monadnock* are well under way, one being now at the proving ground. They can be completed by July 1, 1895.

Eight-inch turret mounts.—The four 8-inch turret mounts for the *Olympia* have been completed. Two of them have been delivered at San Francisco; the third is at the Santa Cruz Powder Works, where it is in use with the gun in testing powder; and the fourth is in the shop, where it is in use in experiments with sights.

A spring-return sleeve mount for the battle ships has been designed, and a contract has been made for forty sets of castings. One set of castings has been received, and work on the mount is being pushed. The remaining thirty-nine sets will not be cast until the trial of the first mount is had.

Experiments have been made with a hydraulic telescopic sight, connected directly with the gun, but so far it has not proved entirely satisfactory. Several forms of geared sights have been suggested, one of which has received the approval of the Bureau for trial.

Six-inch mounts.—At the date of the last report there had been completed one hundred and fourteen 6-inch mounts in all. Of these, one was the pivot mount for the *Dolphin*, the only one of its type constructed; twenty were of the broadside and shifting-pivot type, and the remaining ninety-three were center-pivot mounts.

Five C. P. mounts have been completed during the year. There remain three to be manufactured (two of which are approaching completion) to complete the one hundred and twenty-two mounts thus far ordered.

Castings for eight rapid-fire mounts have been ordered. One of these mounts is completed except the oscillating bed, the casting for which has but recently been received. The bronze castings for the combined sleeve and recoil cylinder have been made for the whole number and are being machined.

Five-inch rapid-fire mounts.—Twenty-five 5-inch rapid-fire mounts have been completed during the year, five are nearly completed, and six others are in hand, parts of two sets of castings remaining to be delivered to make up the entire number (sixty-six) ordered.

All of these mounts were originally intended to be provided with directing bars, and the fifty-four mounts already issued are so fitted. Of the remaining twelve mounts three have been assigned to the *Detroit*, *Marblehead*, and *Montgomery*, to be fitted with shields and for side training with telescopic sights. The other nine mounts are unassigned at present.

A new type of mount for this gun has been designed and detail drawings are now being made. In this mount the gun will recoil within a cylinder, the pistons being attached to a band on the cylindrical part

of the gun. The side training and telescope sights form a part of the design. One set of castings has been authorized for trial, and should the mount prove successful the type will be adopted for the *Brooklyn's* guns.

A change in these mounts has been made in replacing the bronze oscillating slides with steel ones, the former having proved too weak in service to sustain the continued shock of firing the guns. The mounts of the *Cincinnati*, *Raleigh*, and *Olympia* have been fitted with the steel slides, and those of the *Detroit*, *Marblehead*, and *Montgomery* will be so fitted as soon as the castings (which are long overdue) can be received and machined.

The positive action friction clutches have been supplied to all of these mounts, the *Detroit* and the *Montgomery* having recently been fitted with them.

Four-inch rapid-fire mounts.—Sixteen mounts, Mark II (with directing bar), and four of Mark III have been completed during the year, and thirteen others (Mark III) are in progress. Eight of these are nearly finished, six for the *Alliance* and two for the *Monadnock*, the other five being partly machined. These five mounts, with one to be constructed from one of the two sets of castings still due from the Midvale Steel Company, will be assigned to the *Puritan*. Twenty-nine sets of castings remain to be ordered to complete the batteries for the *Iowa* and gunboats Nos. 7, 8, and 9.

The Mark III mount, with side training gear, has given great satisfaction, and all the vessels later than the *Minneapolis* (including the monitors) are supplied with them.

The mounts of the *Columbia* and *Minneapolis* are fitted with the positive friction clutch on the training gear. New training shafts with the same clutch have been supplied to the *New York*, the *Castine*, and the *Machias*.

Telescope sights are fitted to all Mark III mounts, except those for the *Essex* (six), which have peep sights, that have given satisfaction in service.

The 4-inch twin mount has been completed and has been tried at the proving ground. The advantage of this form of mount has not been so great as to recommend its adoption.

Gun mounts completed and in process of manufacture at the naval gun factory.

	13-inch turret.	12-inch turret.	10-inch turret.	8-inch.		6-inch.			5-inch R. F.	4-inch R. F.
				Turret.	C. P.	Broadside shifting, etc.	C. P.	R. F.		
Completed Sept. 15, 1893	0	3	10	4	18	21	93	0	30	40
Completed since that date	1	2	2	4	0	0	5	0	25	20
Total completed	1	5	12	8	18	21	98	0	55	60
Nearly completed	0	0	4	0	0	0	2	1	5	8
Partly completed	4	3	4	1	0	0	1	0	4	5
To be manufactured	8	0	0	39	0	0	0	7	2	*25
Total made and in progress	13	†8	‡20	48	18	21	101	8	66	93

* For gunboats Nos. 7, 8, 9, and one for *Iowa*.
† Four being designed for *Iowa*.
‡ Two for *Terror*, built by contract.

ELECTRIC FIRING.

A simple electric firing attachment has been devised by Lieut. Morgan for use with external electric primers in B. L. R. guns, and after successful trial on the 6 and 13 inch guns at the proving ground it has been adopted for service. The 8-inch gun and the two 6 inch guns of the *Columbia* have been fitted with this attachment.

Lieut. Morgan has also designed an electric firing pin for rapid-fire guns with fixed ammunition. This firing pin and its attachment are interchangeable with the percussion firing pin and trigger box, so that either mode of firing can be made use of. The firing pin has been tried in a 5-inch gun with the Dashiell breech mechanism and in the two rapid-fire 6-inch guns with satisfactory results, and the attachments are now being made for all 5-inch guns that have been issued to service.

The firing battery, which is very compact, consists of three dry cells, contained in a water-tight sheet-iron box secured to the mount.

The Bureau has directed that all guns above the 4-inch caliber are hereafter to be fitted for electric firing.

SECONDARY BATTERY MOUNTS.

The following secondary battery mounts, etc., have been manufactured for issue during the year: Sixty-three 6-pounder recoil mounts, eight 3-pounder recoil mounts, thirty-three 1-pounder recoil mounts, thirty-five 6-pounder cage stands, ten 1-pounder cage stands for ships, thirty 1-pounder cage stands for boats, twenty-one 1-pounder deck circles, six 6-pounder rail sockets, and two 1-pounder rail sockets.

Shields have been fitted to eight 6-pounder mounts, four 3-pounder mounts, and four 1-pounder mounts.

AMMUNITION HOISTS.

The 8-inch turret ammunition hoists for the *Olympia* have been completed and delivered. The 5-inch hoist for the *Cincinnati* and those for the *Olympia* have been shipped.

A 6-inch hoist for the *Maine* has been designed, and the detail drawings are being made. The design is entirely new.

Designs and drawings are being prepared for gunboats Nos. 7, 8, and 9.

The 5-inch hoist built from the designs of Lieut. Drake for the *Montgomery* was not satisfactory.

ORDNANCE OUTFITS.

Complete outfits have been supplied to the *Marblehead*, *Columbia*, *Olympia*, *Cincinnati*, and *Raleigh*. The outfits of the *Minneapolis*, *Maine*, *Texas*, *Puritan*, *Amphitrite*, *Monadnock*, and *Terror* have been supplied in part.

PROJECTILES.

By direction of the Bureau the casting of iron projectiles has been stopped, but such projectiles as are already cast are to be completed as they are required for target practice or proof firing. Ten 8-inch shell for the Hurst gun, ten experimental high-explosive shell, and one hundred and twenty-five 3-inch solid shot have been manufactured.

Projectiles have been machined, banded, and prepared for service, as follows:

13-inch armor-piercing projectiles	149	
12-inch armor-piercing projectiles	256	
10-inch armor-piercing projectiles	487	
8-inch armor-piercing projectiles	687	
6-inch armor-piercing projectiles	357	
5-inch armor-piercing projectiles	1,305	
4-inch armor-piercing projectiles	1,397	
		4,638
6-inch forged steel shells	3,210	
5-inch forged steel shells	10,449	
4-inch forged steel shells	5,545	
		19,204
13-inch cast iron shells	77	
8-inch cast iron shells	129	
		206
10-inch cast steel solid shot	11	
10-inch cast steel shells	4	
8-inch cast steel shells	4	
6-inch cast steel shells	2	
		21
Total		24,069

MISCELLANEOUS.

There have been manufactured 2,000 Schenkl fuses, 5,622 adapters, 3,650 base fuses, 100 base plugs, and 10 gun-cotton detonators.

Five sets of reforming and reloading tools have been made, and those heretofore made have been improved.

Eight thousand and forty-four 5-inch and 8,000 4-inch ammunition boxes have been made, as well as the necessary miscellaneous articles of outfits.

Nine hundred and twenty-three 13-inch powder tanks have been made.

IMPROVEMENTS.

The conversion of the mold loft into a forge shop is not yet accomplished. The work on the building is about completed, and foundations for the hammers, cranes, and furnaces have been laid. Requisitions have been made for material for blast pipes for furnaces and forges, and these will soon be supplied and the forges erected. A new hammer has been ordered, but is not yet delivered. The transfer of the other hammers from the old shop can not be made until the blast is ready. The new shop will be in operation in about four months.

The equipment of the breech mechanism shop has been completed. A small building in which breech mechanism work was formerly done has been converted into a projectile shop. The transfer to this shop of the shell lathes, hydraulic press, etc., which were before distributed in different buildings, allows the projectile work to be concentrated in the new shop, and has reduced the cost of handling of the projectiles in a marked degree. The output has also been materially increased, 100 shells being turned out every day, or an average of 2,600 per month.

Four new boring mills have been added to the plant of the gun carriage shop. Two others that have been ordered are not yet delivered.

The extension of the gun carriage shop is in progress. A part of it has been cleared out and piles have been driven for the crane supports. This work can not be taken in hand thoroughly until after the transfer

of the forge shop. An appropriation for tools for this shop is now available, and requisition for the tools have been made.

The work of fitting the breech mechanisms to the 13-inch guns, which was formerly done in the gun shop, is now done outside, a portable shed having been constructed to cover the breech ends of two guns at the same time, for the protection of the tools and the workmen. The drilling on these guns is done by means of electric drills, which have also been applied to other work in the open.

Improvements have been made in the methods of doing certain portions of the work on the guns and mounts. The most notable of these is an attachment to one of the large gun lathes for rifling the recoil cylinders of the large mounts. This attachment has reduced the time of rifling a 13-inch recoil cylinder from thirty-two days to less than eight days.

FOUNDRY.

The condition of the roof of the foundry has occasioned considerable apprehension. The roof is covered with slate, but the trusses and sheathing are of wood, and these have become so dry and penetrated with dust that some of them almost invariably take fire when a large casting is poured. This has come to be such a matter of course that the first operation in preparing for pouring is to lead out the fire hose and station hands at the water heads. The roof should be replaced by one of metal, but before this is done the foundry should be remodeled and rearranged. As it stands at present, it is antiquated, and the furnaces, which have been long in use, are worn out. A design has been prepared for a foundry suited to modern requirements, and an estimate has been submitted for building and equipping it.

STEEL CASTINGS.

The work on the mounts has been much delayed by the great difficulty of obtaining sound steel castings. A large proportion of the castings received from several makers are rejected, either on ballistic test or on account of blowholes, or other imperfections. The rejections on one contract amounted to more than 40 per cent of the number of castings received. Such a state of affairs is extremely disadvantageous, not alone because of the delay, but also because of the work that is expended before the defects are discovered. Under the present system of competitive bids manufacturers take contracts at prices which can not be remunerative if sound castings, made of good material, are to be furnished.

It is a question worthy of serious consideration whether the Government should not make its own steel castings. It is believed, if the remodeling of the foundry is authorized, that a steel-casting plant could be added at a moderate increase of expenditure.

INSTRUCTION OF SEAMEN.

The course of instruction for seamen has not been changed in any essential particular. During the year 76 seamen have taken the course, and 43 have qualified as seamen gunners. There are at this date 23 seamen under instruction. Lieut. B. W. Hodges, attached to the receiving ship *Dale*, has charge of the instruction of the enlisted men.

PERSONNEL.

The following are the names of the officers attached to the gun factory and the distribution of the duties:

Lieut. Commander E. H. C. Leutze: General duty in shops; installation of machinery; making target backings, and all outside work.
Lieut. G. Blocklinger: Powder tanks; pattern loft; work for naval proving ground, and miscellaneous work.
Lieut. Herbert Winslow: 10-inch guns and mounts; ammunition hoists other than those for 12 and 13 inch guns.
Lieut. T. M. Potts: 12 and 13 inch guns and mounts.
Lieut. Albert Gleaves: 6-inch guns and mounts; torpedo launching apparatus, etc.
Lieut. W. L. Rodgers: 8-inch guns and mounts; pressure gauges.
Lieut. J. H. L. Holcombe: secondary battery mounts; projectiles and fuses.
Lieut. Stokeley Morgan: 5-inch guns and mounts; electrical work; electric firing attachments; primers.
Ensign B. C. Decker: 4-inch guns and mounts and gun locks.
Gunner William Walsh: In charge of manufacture of miscellaneous articles, and of packing and shipping manufactured articles.
Gunner F. C. Messenger: In charge of the naval magazine at Bellevue, and assists in instruction of seamen.

These officers have performed the various duties required of them in a very acceptable manner. The services of Lieut. Commander Leutze deserve special recognition.

Lieut. Alfred Reynolds, Lieut. J. H. Gibbons, Ensign A. L. Key, and Ensign J. M. Poyer have been detached from ordnance duty during the year. Particular mention should be made of the valuable services and attention to duty of the three officers last named.

Gunner John J. Walsh was attached to the yard on temporary ordnance duty for a few weeks.

Very respectfully, your obedient servant,

THEO. F. JEWELL,
Commander, U. S. Navy, Superintendent Naval Gun Factory.

The COMMANDANT, NAVY-YARD,
Washington, D. C.

No. 2.

ANNUAL REPORT OF NAVAL TORPEDO STATION.

U. S. NAVAL STATION, TORPEDO STATION,
Newport, R. I., September 22, 1894.

SIR: I have the honor to submit the following annual report of the condition of this station, of the work completed during the past twelve months, and of that now in progress and contemplation:

The following changes have occurred in the personnel:

Reported for duty.—Surg. H. E. Ames, November 3, 1893; Surg. A. F. Price, March 5, 1894, and Acting Gunner James Shannon, April 20, 1894.

Detached.—Surg. P. Fitzsimons, November 3, 1893; Surg. H. E. Ames, March 5, 1894; Assistant Paymaster C. S. Williams, March 31, 1894, and Gunner M. W. Gilmartin, April 14, 1894.

The present assignment of duty is as follows:

Commander G. A. Converse: Inspector of ordnance, in charge of station.
Lieut. Commander Charles Belknap: General charge of grounds, buildings, wharves, boats, etc.; supervision of enlisted men, including detail of seamen under instruction; in charge of manufacture of high explosives.

Lieut. Commander Duncan Kennedy: Charge of electrical laboratory, dynamo room, and experimental electrical work; instructor in electricity.
Lieut. G. F. W. Holman: Charge of torpedo assembling room; inspection of outfits, magazines, and manufactured explosives; instructor in practical torpedo work.
Lieut. Roy C. Smith: Charge of preparations for general experiments; immediate charge of *Stiletto;* member of torpedo board.
Lieut. E. E. Capehart: Charge of manufacture of fuses, primers, etc.; instructor in diving; assistant instructor in practical torpedo work.
Gunner James Shannon: Assistant to inspector of outfits, magazines, etc.
Surg. A. F. Price: Medical officer.
H. F. Brown: Chemist.
Karl Hedburg: Draftsman.

BUILDINGS, WHARVES, BOATS, PLANT, ETC.

Buildings.—The buildings generally are in fair condition, having received necessary repairs from time to time during the past year. All are now being repainted, and when this work is completed it is expected that they will require but little or no expenditure of labor or material for another year. The furniture in some of the dwellings is in poor condition, and much of it will require replacing at an early date.

Several changes have been made in the various workshops and laboratories, principally with a view of greater convenience in the execution of the work carried on therein, and for the purpose of lessening liabilities to fires from accidental causes. The wood floor in the copper-smith's shop has been removed and concrete substituted. The brick building forming a part of the smokeless-powder works has been divided, and the space made available is used for the sawing of gun-cotton and filling of warheads of automobile torpedoes, an operation which, from its nature, should be carried on in an isolated place.

The use of the upper part of the machine-shop building as a carpenter shop should, for various reasons, be discontinued as soon as practicable. The machinery being high up, and much of the shafting being supported from the roof, causes a great vibration in the walls of the building itself, which must, in the course of time, weaken the entire structure. The presence of sawdust and shavings is always a source of anxiety, although they are removed daily, and unusual precautions are taken to guard against a fire originating from spontaneous combustion or other causes. It is recommended that a suitable building for a carpenter shop be erected at some convenient place on the north end of the island, near the present location of storehouse No. 2.

The paint shop, to which attention was called in my last report, has not yet been changed, as no funds were available for the erection of the proposed building, which should be of brick or other noncombustible material. It is hoped that this change can be made during the present year.

Wharves.—The main wharf has received slight repairs during the past year, and, while serviceable, will, at an early date, require considerable outlay to put it in good condition. Much of the piling should be replaced, and some of the sills will have to be renewed.

The condition of the ferry wharf has been improved by repairs, which it has long needed, and the floats used both at the island and at the landing in town are in excellent order.

Marine railway.—The insufficient depth of water at the outer end of the marine railway was alluded to in my last report. Since then these ways have been lengthened 100 feet. It is now possible to haul out the *Cushing* or any vessel of similar length and draft at any stage of the tide. Work of extending these ways was done by the force of this

station, the diving operations being performed by the seamen gunners under instruction. The time consumed in doing the work was remarkably short, and that it was well done is evidenced by the fact that no difficulty whatever was encountered the first time a vessel was hauled out, a circumstance which reflects great credit upon the men employed.

The smaller ways are in good condition.

Tug Fortune.—The hull of this vessel is in fair condition; the engines, while still serviceable, are of an obsolete type and unsuited to a tugboat, and the boilers are practically worn out. While the vessel can still be used in cases of emergency, it can not be relied upon for continuous or difficult service; the boilers constantly give out, and frequently the fire under them has to be hauled until repairs can be effected.

During the past year the *Fortune* has participated in the speed trials of the *Montgomery*, *Columbia*, *Marblehead*, and *Minneapolis*, and in December last took the gun-cotton outfit of the cruiser *New York* to the navy-yard at New York.

This vessel is useful for accommodating the enlisted force attached to this station and as living quarters for the seamen under instruction there being ample space for berthing and messing purposes. Inconvenience is caused whenever the vessel is ordered away in providing living quarters for the seamen under instruction, the one building on the island available for the men habitually here being too small. Should the vessel be withdrawn for the purpose of receiving machinery and boilers, for which an appropriation has been made, it is requested that its place be filled temporarily by the assignment of another vessel which could serve as a receiving ship or barrack during the *Fortune's* absence. In this connection it must be borne in mind that the isolated position of the station makes it absolutely necessary to have a force of men present at night which can be available at a moment's notice in case of fire or accident.

Ferry launches.—Extensive repairs are being made to the hull and machinery of the ferry launch *Billow*. Her boiler is now being retubed and her engines are receiving new crank shafts. When completed the boat will be in good condition. The hull of the *Wave* is in excellent condition, and the engines were but recently overhauled. The boiler was retubed immediately after the unfortunate explosion which occurred in March last and is believed to be good for a year or more. The shell of the boiler, however, has considerably deteriorated, and it is recommended that it be condemned and replaced by a smaller water tubular boiler at an early date. This change would give increased space in the fire and engine rooms, now cramped and crowded with machinery.

Other launches.—The *Ripple* and *Spray* have new boilers and the engines are in fair condition, though old and considerably worn. The hulls of these boats show signs of deterioration from age, and can not be expected to last any great length of time. Both boats should be replaced by others of more modern build in the near future on the ground of efficiency and economy. The other boats belonging to the station are in a fair serviceable condition.

Plant.—The machinery, tools, and general plant used in the manufacture of torpedoes and torpedo apparatus are in a good condition. An additional lathe and a quantity of tools have been added during the past year. More machinery, however, is required, as that on hand is in constant use and pressed to its utmost capacity to meet the demands of current work.

The main boilers have been thoroughly overhauled and retubed and are now in an excellent condition. The use of water supplied by the New

port Water Works has been found to be most beneficial, and the deposit of scale and mud which took place so rapidly when using the water furnished by the wells and cisterns on the island no longer gives trouble. A new 75-horse-power boiler of the Babcock & Wilcox type has been ordered and is to be installed in working order by the 15th of the coming month. This additional steam power is rendered necessary by the increased demands caused by the new gun-cotton factory and smokeless-powder works.

Instruments.—No additions have been made to the electrical, chemical, and other instruments and apparatus used for investigation, experiment, and instruction. Those on hand are in good condition and answer all present and prospective requirements.

Lighting system.—A new lighting plant of modern type is much desired, both on account of increased efficiency and economy and for purposes of instruction of the seamen, who are here taught to run dynamos and take care of the electrical plant on board our naval vessels. Arrangements are being made to procure new underground cables, and it is hoped that a new system may be laid this fall, as that now in use is insufficient for the requirements of the station and is in poor condition.

Water system.—The station is at present connected with the water system of Newport by a 2-inch main. This pipe crosses property belonging to the Old Colony Steamboat Company, on the Newport side of the harbor, and during recent dredging operations carried on by that company was twice destroyed and our service entirely cut off. Arrangements have been made with the Newport Water Company whereby they will extend a 4-inch main to the end of the wharf on which the main sewer pipe of the city is laid and provide suitable means for connecting our pipe now in use to it. At this same point a 3-inch pipe will also be connected and laid across the harbor, thus affording a double system and an increased supply which will be necessary when the new factories commence operations.

TORPEDO BOATS.

Stiletto.—The *Stiletto* is in excellent order and has been extensively used during the past year for experiments with the Howell torpedo. Experiments are now in progress having for their object the determination of the distance at which the sound of the motor and fly-wheel of the torpedo can be detected under various conditions of wind and weather. When these are completed it is proposed to regularly equip the *Stiletto* with Howell torpedoes and carry out an exhaustive system of experiments for the purpose of ascertaining the performance of the torpedo when fired at various angles from a boat going at different speeds. The *Stiletto* recently made a trip to South Amboy, N. J., carrying a quantity of smokeless powder intended for shipment to the proving ground at Indian Head. The trip from this station to that port was made with great ease in about twelve hours, and clearly demonstrates the practicability of rapidly transporting high explosives between various points on the coast at a comparatively small expense.

Cushing.—The *Cushing* has been attached to this station during the past year, with the exception of the winter months, during which time she was laid up at the Washington navy-yard for a general overhauling.

The twin-tube turntable mount, which was constructed at this station last year and placed on board the *Cushing*, having been found unsuited to the *purpose, has been* removed, and two single mounts,

designed by Lieut. Fletcher, and manufactured at the Washington navy-yard, have been substituted. By the present arrangement the tubes are carried well out at the sides of the vessel, work independently of each other, and can be pivoted through a large angle of fire. While the total effective beam fire of the boat has been somewhat reduced by this arrangement of the tubes, the bow fire has been practically trebled, as the tubes can be pivoted at small angles with the keel, and three torpedoes simultaneously discharged nearly ahead. The working of this mount is most satisfactory, and the general system a great improvement over that formerly used.

This vessel is kept busily employed during the season in torpedo practice and experimental work, the results of which have been reported to the Bureau from time to time by Lieut. Fletcher, her commanding officer. Much valuable data has been obtained concerning the Whitehead torpedo, and many men have been taught in its use and manipulation.

TORPEDO ASSEMBLING ROOM.

As stated in the last annual report, the second story of the machine shop, hitherto used as a museum, has been cleared out, and is now used exclusively as a "torpedo assembling room." Provision has been made for overhauling torpedoes and preparing the outfits for issue. Brackets of the standard form have been put up for the accommodation of twelve torpedoes, and this number will shortly be increased to twenty-four. The room is fitted with a complete trolley system, embracing hangers, trolley rails, switches, trolleys, hoists, etc., necessary for handling, with facility and celerity, all the torpedoes that can be conveniently stowed in it.

An upper-deck broadside mount has been set up in one corner of the room, and is used for experimental, instructional, and drill purposes. The seamen under instruction are here taught to disassemble and assemble the torpedoes, adjust them, transport and stow them in their brackets, and to transport them from their place of stowage by means of the trolley system to the launching tube, loading them directly into it by means of the hoist and without the intervention of the loading tray or other auxiliary. While 2 men are found sufficient to handle the torpedoes under ordinary circumstances, a crew of 4 men can take the torpedo from any part of the room and load it into the tube in a remarkably short space of time. The efficiency of the entire system is thus practically demonstrated—men are taught to become proficient in its use, and the work of keeping the torpedoes themselves in perfect adjustment and repair is greatly facilitated.

AIR-COMPRESSOR ROOM.

The small building adjoining the fire-engine house, which formerly contained the apparatus for generating liquid carbonic-acid gas, has been renovated and fitted as an "air-compressor room."

An air pump of the Whitehead pattern, manufactured by the E. W. Bliss Company, and similar to those issued to the service, has been permanently installed. An air pump of the Brotherhood type of the most recent pattern has been recently received and set up for use, and it is also to be used as a standard by which to gauge the capacity of such other pumps as may from time to time be submitted for trial.

Suitable foundations have been prepared for the installation of pumps which may be received for test or experiment, and all arrangements

have been made for connecting the water, steam, air, and other pipes, so that no delay need occur in the prosecution of such work.

This room is provided with two separators and an accumulator, and an air pipe has been laid to the boathouse on the main wharf. Another air pipe will soon be connected to the torpedo assembling room, thus enabling the torpedoes stowed there to be charged and tried during adjustment.

TORPEDO TESTING STATION.

The boathouse at the end of the wharf has been cleared out and converted into a testing station. It is provided with suitable hoists, trucks, etc., for conveniently handling eight or ten torpedoes at a time. A workbench has been fitted and kits of tools furnished. The building is connected by pipe with the air-compressor room, some 600 feet distant, and means of signaling have been provided so that air can be supplied and torpedoes charged as required. Under ordinary circumstances, with the accumulator in the air-compressor room fully charged (which is the habitual custom during the working season), a single torpedo can be charged, ready for firing, in from five to seven minutes; and with the air compressors in operation, torpedoes should be charged at the rate of three or four an hour.

An under-water launching cage, similar to those used by the Whitehead Company for adjusting torpedoes, has been provided. A wharf, some 20 feet long by 15 feet wide, has been built at the north extremity of the boathouse, and on it has been mounted a turntable tube, the axis being from 5 to 9 feet above the surface of the water according to the state of the tide. A suitable crane of convenient form for handling torpedoes has also been erected on this wharf.

The under-water cage, the direction of which is fixed and the axis horizontal, and the over-water tube, which can be pivoted, elevated, or depressed, are used in testing and adjusting torpedoes. There is an unobstructed range of some 1,500 yards, which crosses the main channel at the northern entrance of the inner harbor diagonally; but the velocity of the tide is never such as will produce an appreciable deviating influence from a straight course on a torpedo going over the range during the short time of not more than thirty seconds, in which the torpedo will be subjected to its action. This range has just been dredged, so that there is now, at lowest tide, a depth of at least 26 feet for a distance of 200 yards from the muzzles of the launching tubes; and at no point of the range for a distance of 1,000 yards is there less than 20 feet of water.

The *Cushing* is berthed alongside the boathouse and by means of the crane on the wharf can land her torpedoes to be charged or repaired, or receive those which are ready for use, with great rapidity.

The equipment of this testing station, and the dredging of the channel, afford excellent facilities for testing torpedoes under the varying conditions of depth of water, and of height of tube above water (which will obtain at different stages of the tide), and for determining the effect produced on accuracy of runs by different depressions of the tube and varying velocities of impulse. The bow tube of the *Cushing* can also be utilized over the same range for obtaining comparative results as to the advantage or disadvantage of air or powder impulse.

With these arrangements it is now possible to accomplish in a very short time an amount of experimental work, which last year would have consumed the entire season available for torpedo practice.

AUTOMOBILE TORPEDOES.

Whitehead torpedo.—The 100 45 cm. Whitehead torpedoes Mark I, for which the Bureau contracted with the E. W. Bliss Company in May, 1891, have been completed and delivered at this station, the last consignment of 5 being received June 26, 1894. Of the second order for 50 Mark II Whitehead torpedoes, contracted for May 12, 1894, 20 have been received up to the present time, and the resident inspector reports that other consignments are to follow without delay.

In all, therefore, 120 improved Whitehead torpedoes have been delivered. Fourteen only have been issued to the service; the remainder are held in readiness for immediate delivery to vessels which may arrive or for shipment when ordered.

To provide the necessary stowage space for these torpedoes, the casemates of the old fortifications, which are directly under the commanding officer's quarters, have been cleaned out, renovated, and prepared as storerooms. They are kept dry, suitably warmed by a steam-heating system, and are admirably well adapted for the purpose of stowing torpedoes when packed for transportation, being practically fireproof. There is stowage room for about 100 torpedoes.

Howell torpedo.—Of the Howell torpedoes, for which a contract was made by the Bureau with the Hotchkiss Ordnance Company in January, 1889, some fifteen have been completed at the company's works and are now undergoing tests at the proving station in Tiverton. An early delivery of the entire number called for by the contract is expected.

ACCESSORIES FOR AUTOMOBILE TORPEDO OUTFITS.

Much time and attention has been devoted to perfecting details of the accessories and supplies which are to accompany the automobile torpedoes when issued to ships; and as a result standards have been established, and the greater part of all articles required for ten outfits are now completed. The articles furnished as accessories of an outfit are as follows:

War noses.—The war noses, forming a part of the torpedoes, as received from the contractors, are packed in lock boxes holding 2, 4 and 6 respectively, for outfits of 2, 4, and 6 torpedoes.

Exploders.—Of these 100 have been manufactured and put up in convenient tin boxes lined with cork and holding 2, 4, and 6 respectively. Two of these tin boxes are inclosed in a compact wooden box. The allowance proposed for issue is 2 exploders for each torpedo; hence one wooden box contains enough exploders for an outfit consisting of 2, 4, or 6 torpedoes.

Dry primers.—The dry primers are put up in glass tubes, which are contained in a box conveniently arranged so that it can be opened to admit light for purpose of inspection without removing or handling them. Litmus paper being placed in each tube, between the gun-cotton discs, the presence of acid in the gun cotton or any signs of deterioration can at once readily be detected.

Wet primers.—To provide for contingencies, an additional set of primers in a wet state is supplied with every outfit. These primers are put up in brass tubes identical in size and form with the receptacle in the war head of the torpedoes themselves; a precaution taken to insure the perfect fit of the primer when it becomes necessary to insert it in the war head.

Chemical box.—A box containing the chemicals necessary for making tests of both wet and dry gun cotton, put up in convenient form for use, is supplied with each outfit.

Leather washers.—A box containing an assortment of the different sizes of leather washers which are required in making various joints in the Whitehead torpedoes is provided. These washers are cut by means of carefully prepared punches, which insures uniformity of size and shape; the material used being the different kinds of leather best adapted to the particular use for which the washer is intended—kid, calfskin, porpoise hide, and undergrade leather being found specially adapted for different purposes.

Rubber washers.—Washers, or gaskets of pure rubber, of the various shapes and sizes required for special use in making the joints of the torpedo and of air pipes, have been specially manufactured and are packed in a convenient box of zinc, in such a manner as to insure their preservation and retention of shape under the different conditions of temperature and climate to which they are liable to be exposed during a cruise.

Depth and rolling registers.—Depth and rolling registers of the Whitehead pattern have been manufactured at this station, and a set issued with each outfit.

Box of spare parts.—An assortment of the various screws, nuts, levers, etc., which are liable to become lost or broken in service, is sent with each outfit. Boxes suitably partitioned and containing receptacles for the various articles, some thirty in number, have been prepared and are kept in stock.

Gauges.—Gauges for use with air-compressors and accumulators or for measuring remaining pressure in the air flask of a torpedo after a run are packed securely in specially designed boxes.

Transporting strap.—A strap has been devised for slinging torpedoes in transportation. This strap can be quickly clamped to the torpedo and readily taken off, and is superior to the old, cumbersome strap in lightness, flexibility, and compactness.

Directors.—The subject of suitable torpedo directors received much attention during the past winter, and types have been devised which it is thought will satisfactorily meet all the varied requirements. There are practically four different types, namely: For use with fixed tubes (bow or stern); for upper deck broadside pivoted tubes, in which the director can be placed so that its line of sight is unobstructed; for lower-deck broadside pivoted tubes, in which the line of sight must be restricted to the use of an airport or other similar opening in the side of a ship; and for turntable or central pivoted tubes, which command practically an all-round fire. While the principle involved in all of these directors is the same—that of similar triangles—certain modifications are necessary in the forms of directors themselves to adapt them to the various positions in which they are to be installed, and, at the same time, to retain the ability to make adjustments which are to be applied for speed of the torpedo, deflection caused by the speed of the vessel from which it is launched, and for the course and speed of the enemy. The different types of directors are comparatively simple, compact and easily mounted or installed in place when required for service.

SPAR TORPEDOES.

The manufacture of spar-torpedo outfits has been temporarily discontinued by the order of the Bureau.

There are on hand spar-torpedo outfits designed for the *Detroit*, *Castine*, *Machias*, *Montgomery*, and *Marblehead*, and a number of incomplete outfits unassigned.

ISSUES TO THE SERVICE.

Spar-torpedo outfits.—During the past year partial spar-torpedo outfits have been supplied to the *Vesuvius*, *Kearsarge*, *Raleigh*, Naval Academy, Artillery School, Norfolk navy-yard, Mare Island navy-yard, New York navy-yard, and Massachusetts naval militia.

Whitehead torpedo outfits.—Complete Whitehead torpedo outfits have been supplied to the *New York*, *Marblehead*, and *Bancroft*.

Howell torpedo outfits.—The *Bancroft* was partially supplied with a Howell torpedo outfit.

STOWAGE AND HANDLING OF TORPEDOES ON BOARD SHIP.

Bulkhead brackets.—A bracket intended to be secured to a bulkhead or the side of a vessel has been devised for stowing torpedoes on board ship. A quantity of these brackets have been made for use at this station and give great satisfaction.

Overhead brackets.—For use in places where no space is available for stowing the torpedoes against the side of the ship or a bulkhead a special form of bracket has been devised, intended to secure to the deck beams overhead. The brackets themselves are connected by T-rails, which are provided with suitable clamps for attaching them to the deck beams. Secured to these rails is a yoke carrying a pulley and fitted with a wire-rope pennant, which is to be used in hoisting the torpedo into place. The lower halves of the brackets, which are removable, but which support the torpedo when in position, are firmly held by clamps fitted with adjustable screw wedges, so that no movement of the torpedo can occur. The apparatus is practically "self-contained," and in fitting it to ships no holes are required to be bored through the beams, decks, or other parts of the hull.

Hoists.—A compact but powerful hoist has been designed. Its principal features are its combination with a trolley and a detachable or portable hoisting and hand chain. It is readily assembled when needed, and requires the application of but 40 pounds pull to raise a torpedo weighing 840 pounds. With it two men can with facility handle and transport the torpedo as required. By making the lifting chain and hand chain detachable they can readily be shifted to other hoists or trolleys when passing from one compartment to another, thus doing away with the necessity of having a flying rail or other device for passing through water-tight bulkheads.

Trolley system.—A complete trolley system, consisting of rails, rail-hangers, switches, etc., has been devised, and detailed drawings have been prepared. Its efficiency has been demonstrated by actual use, and it is believed that it fulfills all the necessary requirements of strength and lightness, with facility of manipulation.

Trucks.—Trucks suitable for the handling of torpedoes on the upper deck of ships, and in other places where it may not be deemed expedient to put up a system of trolley rails, have been designed and manufactured.

In one variety of truck the cradle which carries the torpedo is made justable, enabling the torpedo to be raised or lowered a distance of inches, thus permitting the torpedo to be loaded directly into the be without the use of a hoist.

All trucks designed for use on board ship are constructed of metal. he cradles or chocks are faced with leather, and the tires protected y heavy rubber specially made on the wheels at the rubber factory.

Trucks of different designs have been specially constructed for use t this station. In each different arrangements of wheels have been sed with the idea of obtaining the greatest facility in maneuvering a cramped or narrow spaces. While each of the various types tried possesses some merit, none is so far superior to the ordinary form of ruck in which one axle is made to pivot as in the ordinary carriage as to justify its recommendation for service use.

PROGRESS OF EXPERIMENTAL WORK.

The experimental work in progress at the date of my last report has been continued and several of the topics have been brought to a conclusion and reports rendered.

Defense nets.—The withdrawal of the *Destroyer* from the station last November practically put an end to the experiments then in progress with the different kinds of defense nets. A report on the results obtained up to that date was made to the Bureau on the 28th of November, 1893, copy of which is appended, marked A.

The nickel steel net has continued to corrode badly, though it has been under cover in the boat house and has been coated with asphalt once or twice. It is now entirely useless for test purposes. The music wire net is a good deal rusted, but could still be used, though it is evidently not so strong as originally. This corrosion does not affect the Midgley system of manufacture, as it could probably be prevented by galvanizing. The galvanized Bullivant net, which has received exactly the same treatment as the others, with the exception of the coating with asphalt, is apparently in as good condition as ever.

Effect on animal life of submarine explosions of gun cotton.—These experiments were begun on the 15th of December last and continued until the 5th of March. A complete report was submitted to the Bureau on the 12th of March last, copy of which is appended, marked B.

Detection of torpedo boats.—The *Cushing* and *Stiletto* have both been used to test the color of paint best adapted for torpedo boats; also to give practice to the crews of the boats in evading search lights and to the operators at the light in detecting and covering the boats during their approach. The *Stiletto* retains the color of last year—a dark olive green; whereas the *Cushing* has been painted a dark slate gray. An effort has been made to mix the paint with as little oil as possible to secure a dull surface. The best color has not yet been determined.

The boats are able to enter the harbor about half the time without being detected. The *Cushing* on a dark night, with no moon, approached within 100 yards of the *Atlanta* without detection. On another occasion, with the moon quite full, but obscured by light clouds, she approached within 700 yards of the *Miantonomoh* and 1,000 yards of the station light before discovery, the *Miantonomoh* at the time using two search lights and the station one. On another night, with the weather clear, moon in the first quarter and low, the *Cushing* steamed away from the search light in the direction of the moon until lost to sight at a distance of from 1,500 to 1,700 yards, though the operators at the search light were trying to follow her.

In returning to the harbor a short time afterwards she was first picked up by the sparks issuing from the smokestack and when at an estimated distance of 1,200 yards; she was then able to approach to within 1,000 yards before the light was fully focused upon her.

Hall torpedo.—Experiments with the Hall torpedo have been continued during the past year, most of them being under the immediate supervision of Lieut. Hall. A gradual improvement had been noted in the performance of the torpedo until an accident to the main crank shaft caused such serious damage as to render it unadvisable to repair the engines, the efficiency of which had never been considered satisfactory. A new three cylinder Brotherhood engine of the type used in the 18-inch Whitehead torpedo and the material necessary for new shafts have been obtained. As soon as circumstances permit the work of reconstruction will be begun.

Submarine gun and projectiles.—Experiments in firing submarine projectiles from the *Destroyer's* gun were commenced in the fall of last year, but were brought to an unexpected termination by the withdrawal, with the consent of the Department, of the *Destroyer* and the projectiles belonging to her by the Ericsson Coast Defense Company. Previous to her departure three of the ordinary forms of projectiles and two Cunningham rocket torpedoes were fired from her guns. A report of the results of the experiments with the latter was transmitted to the Bureau on November 17, 1893, a copy of which is hereto appended, marked C.

DIRIGIBLE TORPEDOES.

Sims-Edison torpedo.—The Bureau authorized a series of experiments to be conducted with this torpedo, manipulating it from a movable base; and the work of installing the apparatus on board of the tug *Fortune* was in progress when, with the Department's permission, the Sims-Edison Company withdrew their torpedo and all its accessories, thus preventing trials, the results of which had been looked forward to with much interest. It was understood that another torpedo would, in the near future, be supplied for the purpose of carrying on these experiments; but up to the present time no definite information has been received from the company.

Patrick torpedo.—This torpedo remains in the same condition as at the date of last report, no experiments having been made with it in the intervening time.

ELECTRICAL LABORATORY.

Investigations and experiments for the purpose of determining the best form of voltaic batteries for special or general use on board ship and of various kinds of insulated conductors and cables have been made during the past year. As a result of these investigations, a form of battery suitable for use in firing rapid-fire and other guns on board ships has been devised.

A battery of this improved form has been hermetically sealed and submerged in the harbor since November of last year, and although frequent tests have been made no marked deterioration in its electrical properties has been noticed. For the purpose of ascertaining the effect of changes of temperature on the batteries, one was placed in the searchlight tower on the western extremity of the island during the past winter, where it was subjected to extreme cold, while another was placed in contact with the steam heater in the electrical laboratory and

thus subjected to a temperature so high as to render it uncomfortably hot to the touch. In neither case were the electrical properties materially impaired. Still another battery was placed in an inverted position, in which it has remained for several months with no apparent change. Other tests consisted in determining how many contacts of short duration could be made before the battery became so exhausted as to be incapable of firing service igniters. The results have been so satisfactory that this battery has been provisionally adopted for the service and put up in a convenient form for issue to vessels.

The *Columbia, Detroit, Marblehead*, and *Montgomery* have been supplied with batteries of this type.

Considerable use has been made of the chronograph belonging to this laboratory in the velocity tests of the new Navy small arm, while the ballistic tests of the powder used have taken place in the cellar of the building.

The usual routine work and instruction have been carried on, and the time ball has been dropped by telegraphic signals from Washington with its usual regularity.

CHEMICAL LABORATORY.

The work performed at the chemical laboratory during the past year may be summarized as follows:

Torpedo-station gun cotton.—The most important work under this topic has been the determination of the ignition temperature of torpedo-station gun cotton and the effect on the ignition temperature of prolonged heating at 100° C. Experiments which are still in progress indicate that the ignition temperature of gun cotton may be lowered by prolonged heating.

Materials used in the manufacture of gun cotton.—Complete examination has been made of samples of cotton waste and partial examination of one sample.

Gun cotton for purchase.—Complete chemical examination has been made of sample blocks of Du Pont gun cotton from lots 38 to 45 and of a sample of gun cotton from the California Powder Works, of Santa Cruz, Cal. The last sample was especially interesting, since it was made by the hydro-cellulose process and contained a higher per cent of nitrogen than any previous sample of gun cotton examined at this laboratory.

Torpedo-station smokeless powder.—The examination of smokeless powder and of the materials which enter into its manufacture has formed the most important part of the work of this Department during the past year, and may be briefly stated as follows: 13 complete analyses, 38 specific gravity determinations, 34 stability (heat) tests, 23 determinations of the ignition temperature, 14 determinations of the solvents, 4 determinations of the hygroscopicity, and 1 determination each of sodium carbonate, nitrocotton, and metallic salts.

Materials used in the manufacture of smokeless powder.—Stability (heat) tests have been made of 74 samples of torpedo station gun cotton, and of 1 sample of Du Pont gun cotton, for use in the manufacture of smokeless powder.

Complete chemical examinations have been made of a lot of Du Pont nitrocotton, of 6 samples of acetic ether, 4 samples of acetone, 2 of barium nitrate, 1 of potassium nitrate, and 1 of castor oil.

In order to determine the necessary strength and purity of acetic ether, for use in the manufacture of smokeless powder, known mixtures

of pure acetic ether, with varying proportions of ethyl alcohol, methyl alcohol, and water, were tested at the smokeless-powder factory. From the results of these tests the specifications for acetic ether were prepared.

A standard solution of sodium carbonate was prepared for the smokeless-powder factory.

Fulminate of mercury and detonators.—Three hundred and twenty-two service detonators were filled with fulminate of mercury, dried to constant weight, and delivered to the fuse room.

Calcium phosphide.—Forty-five pounds of calcium phosphide have been manufactured and placed in sealed cans, together with the phosphide in bulk which was left over from last year. Two hundred and seventy sealed cans, each containing 10 ounces of calcium phosphide, have been issued for use as torpedo-position signals.

Explosives found in commerce and those received from abroad.—The experiments which were instituted in 1891 to determine the changes taking place in 6 samples of Du Pont cocoa powders, S. N. A. (14), and F. P. C. (82), when desiccated over sulphuric acid, have been completed and the samples analyzed. All the samples suffered a greater loss in weight from the desiccation over sulphuric acid than from the drying to constant weight at 50° C. in an air bath. The results of analysis suggested no explanation of this phenomenon, and it was thought probable that the great density of the grains prevented the escape of all the moisture when the samples were heated for comparatively brief periods of time in the air bath.

Analyses have been made of samples of the following commercial and foreign powders: B. N. 1, Swiss S. P. for 12-cm. guns, Walsrode, Wetteren, California S. P., Rifleite, Leonard S. P., gran. $\frac{12}{14}$, and Leonard S. P. for 4-inch guns.

The analyses of such powders is constantly presenting new problems in analytical chemistry the solution of which requires much time and thought.

Miscellaneous material submitted for examination.—A large amount of miscellaneous chemical work has been done, including, among others, the following subjects: Ethyl alcohol, sperm oil, acetone, india rubber, arsenic in wall papers and kalsomine, Mesco dry battery, Exeter dry battery, boiler scale, sifted carbon, zinc alloy, rubber insulation, copper sulphate, potassium carbonate, milk, spirits of turpentine, raw linseed oil, drying japan, lampblack, red lead, white lead, indian red, yellow ochre, cylinder oil, and zinc bar. Fifty-two battery cases have been paraffined, chemicals have been compounded for the electrical laboratory and the dispensary, and a variety of other chemical work has been done.

Water analysis.—Four analyses have been made of samples of water from the South Well and the Newport service system.

Investigation of chemical methods.—Important analytical investigations have been carried on during the past year, notably the one which had reference to the correct method for determining the per cent of nitro cotton in smokeless powders. From the results of these experiments the correct method for this determination was deduced.

Methods have been elaborated for the valuation of the solvents and other chemicals used in the manufacture of smokeless powder.

Methods for determining the ash in gun cotton and smokeless powder and solvents in smokeless powder are still under consideration.

The leading feature of the work in this department has been the attempt to place all the processes of analysis and inspection on a logical,

scientific, and consistent basis. A careful criticism of official methods for the inspection of torpedo station gun cotton has been submitted, and several important changes and additions have been recommended.

Photographing.—Thirty-nine negatives have been prepared in the photographic room connected with this laboratory.

By products.—A large amount of chemicals has been recovered from the various analytical processes and purified for use in the laboratory, including 20 pounds of acetic ether, valued at $20; 12 liters of ether alcohol, valued at $17; and 8 pounds of C. P. nitric acid from samples, valued at $6. Chemicals have also been manufactured for use in the laboratory, including aqua ammonia and calcium chloride.

NEW GUN-COTTON FACTORY.

The work of rebuilding the gun-cotton factory in accordance with the plans approved by the Bureau was commenced in the latter part of last year, and continued as long as the weather permitted. It was resumed again in the spring and carried on till the close of the fiscal year as rapidly as the money at that time available for the purpose would permit. The appropriation for completing the buildings became available about the middle of July, and the work has been vigorously prosecuted.

The general plan of the plant has, by the Bureau's direction, been enlarged and extended so that facilities may be provided for converting into smokeless powder all of the gun cotton which the original plant was intended to produce. To meet these requirements one more building of the same size as those originally proposed, 32 by 34, and two smaller ones, 15 by 32 feet, are being built.

For the purpose of enlarging the area of ground to the westward of the buildings and protecting it from the encroachments of the sea, it was deemed advisable to build a substantial sea wall, using as a filling the earth taken from the excavations for the buildings themselves. This wall, built of suitable stone, laid in Portland cement, varies in height from 7 to 9 feet, is upward of 7 feet thick at the base, and 5 feet thick at the top. Already 820 feet have been completed, and most of the space in its rear has been filled in. The result is a level plateau about 25 feet wide which extends the entire length of the northwest side of the island, where the gun-cotton plant is located, affording a convenient place for landing material at high tide, and for carting and transportation purposes between the various buildings, which will frequently be necessary when the works are in full operation.

At the present time three of the buildings are so far completed that the machinery will be installed as rapidly as it is delivered; the fourth has its brick walls completed and is ready for receiving the roof, while foundations of the fifth have been laid and are ready for the brickwork. The excavation for the sixth and last will commence the coming week. It is believed that all of the buildings will be finished, ready for occupancy, early in November, and that the entire plant will be in working order not long afterwards.

All of the work in connection with these buildings has been done by day's labor, and under the immediate supervision of the officers of the station. As a result it has been done in a most thorough and satisfactory manner, and it is believed that the cost will be considerably less than had the work been done under the system of contract. Of course all facilities which the station had, such as derricks, hoisting apparatus, lighters, teams, etc., have been utilized in the work, thus to a cer-

tain extent avoiding expenditures which would have been necessary had private individuals undertaken the work.

Nearly all of the machinery which will be required for the operation of this factory has been ordered and the deliveries will commence by the 1st of October. This includes the boilers, drying apparatus, apparatus for disposing of acid fumes, hydro-extractors, acid extractors, rolls for smokeless powder works, piping, steam fittings, etc.

As the operations in each building are to be separate and independent of the others, the work of installing the machinery can be pushed without detriment, and the rapidity with which it can be done is limited only by the force available for the purpose.

GUN-COTTON MAGAZINES.

The magazines on Rose Island are in good condition, as is also the gun cotton stored therein. The plan of stowage on racks continues to give great satisfaction, and the cotton seems to remain in perfect condition—no effects of the changes of temperature being apparent. Experiments to determine the loss of moisture by evaporation of the gun cotton stowed as at present shows that it parts with its moisture very slowly, the decrease not exceeding 5 per cent in six months.

There is at present on hand ready for issue—

Service blocks made at torpedo station	36,965
Service blocks made by Du Pont	74,560
Total	111,525

having a weight of 95,333 pounds wet, equivalent to 71,500 pounds dry.

EXPLOSIVES.

Owing to the destruction of the factory by fire, no gun cotton has been made during the year. With the installation of the new and improved machinery ordered, and with the rearrangement of the various processes which the separation of the factory into different buildings permits, the manufacture can be resumed shortly under conditions which seem to assure the maintenance of the former standard of excellence of the product, with increased efficiency of the plant and safety to the employés.

War-heads.—Seventeen Whitehead and two Howell war-heads have been filled with gun cotton. The apparatus for this work, designed at the station, has been so improved from time to time that the war-heads can now be both expeditiously and economically filled, and notwithstanding that the layers have to be built up and shaped from the 2.9-inch square service blocks, the amount of waste material is very small. For the sake of safety, the gun cotton is soaked prior to sawing and turning until about 25 per cent of its weight is water; as only 17 per cent of the weight of the gun cotton in the war-heads is water, the excess is driven off by the direct application of heat. With the present facilities one war-head can be loaded in a day with ease; this output could be doubled with but little difficulty.

Gun-cotton shell.—Ten steel 6-inch shell were loaded with gun cotton and fitted with dry primer and fulminate exploders and sent to Washington in May last. The waste of gun cotton in filling these was large, and in case any considerable number of shell should be required, the use of a special press for shaping the gun-cotton pulp to the desired form would be advantageous.

Vent sealing primers.—The single-wire vent sealing primer designed by Lieut. Commander Belknap, having been approved by the Bureau, its manufacture has been carried on since February last, and that of the old style of two-wire primer has ceased; there are on hand ready for issue 1,100 of the single-wire primers fitted with terminal.

Fulminate exploders and detonators.—One hundred fulminate exploders for automobile torpedoes have been made, and in addition 200 fulminate detonators were made and delivered to the Pneumatic Gun and Torpedo Construction Company at their expense.

SMOKELESS POWDER.

At the date of the last annual report experiments were being made with a view of improving the durability of the M. N. powders which were manufactured up to that date. The continued decomposition, with evolution of acid fumes, of the various samples, together with the unfavorable results of the experiments and the ballistic trials, led, in October last, to the final abandonment of the M. N. powders and the various processes by which they were made.

In seeking to replace them with an explosive suitable for naval purposes a large amount of experimental work, not only in regard to crude materials, but also in regard to their manipulation, has been done, which it would be tedious to mention here. It will suffice to say that gradually and by means of the experience gained by failures there has been developed a powder which it is hoped will prove to be durable and at the same time of sufficient ballistic excellence to warrant its adoption for use. Until, however, it has been thoroughly tested it will be premature to claim for it any special excellence.

At present experiments looking to the determination of the proper sizes of the powder for the various classes of guns are in progress, and it may be found advisable to select some other form of grain for the smaller guns in order that the powder space may be entirely occupied.

A great drawback to the expeditious working of the factory has been found in its distance from the testing range at Indian Head. As the freight lines from Newport refuse to take explosives of any kind, Government transportation has to be secured for the powder to New York. In consequence it has frequently happened that a considerable interval of time has elapsed between the manufacture of a sample and its test, and the particular point to be brought out has escaped notice. This will, to a certain extent, be remedied by the establisnment of a velocity range with butt on Rose Island. This work is approaching completion, and in a short time it will be possible to test powder for the 1 and 6 pounder rapid-fire guns expediously and satisfactorily.

The work has been further impeded by the necessity, on account of the gun-cotton factory being disabled, of using compressed service blocks for the manufacture of the powder. These have to be specially treated to remove the alkali contained in them and to reduce them to a state of pulp; the results are delay in the process of manufacture and additional expense in the cost of the finished product. Further delay was caused by the destruction by fire of the gun-cotton drying shed on May 1 last. The fire, with its accompanying explosion, which, owing to the nature of the building, was fortunately with but trifling damage, seems to have been caused by the spontaneous combustion of the gun cotton, whether by friction or by the ignition of some particles of the gun cotton which by long exposure to heat had experienced a lowering of their ignition point it is difficult to decide. The cause of the fire was investigated by a regularly appointed board of inquiry.

A new drying house has been built, in which every precaution has been taken, both in regard to the materials of the apparatus used and in the arrangement of the steam pipes, to prevent a recurrence of the event. As now arranged, the steam piping at no place is nearer to the floor and walls than 15 inches, except at the spot where it enters and leaves the building. In the former shed it led along the floor on three sides of the building. The drying screens are now of cotton drill, instead of galvanized sheet iron, formerly used; they are supported by wood frames, all of which can be easily removed to permit of periodical cleansing of walls, floor, and steam pipes. The condition and temperature can be noted at any hour from the outside, and a thermostat insures the temperature being kept at a point not likely to engender decomposition in the gun cotton.

Experiments have been made from time to time, as the regular work permitted, for the purpose of finding a powder suitable for the 6 mm. gun selected for naval use.

Some of these powders recently made have been tested in the new Navy small-arm, and with three rounds the mean velocity was 2,394 feet, with a pressure of 44,949 pounds; yet it can not be claimed that these results are as good as those obtained with some foreign powders.

The systems used in the manufacture of smokeless powders and a detailed description of the processes employed will be made the subject of a supplemental report to the Bureau.

The following tables show the kind and disposition of the powder manufactured:

Kind.	On hand Sept. 1, 1893.	Made.	Used at—		Destroyed.	On hand Sept. 20, 1894.
			Station.	Indian Head.		
M. N	135	161¼	5¼	194¾	96¼	.....
Experimental	.....	64¾	30¼	34½	.....	.....
K	.....	717¼	12½	433⅛	.....	271¼
Total	135	943¼	48	662¾	96¼	271¼

From this it will be seen that of the 943¼ pounds made 271¼ are on hand, the balance having been disposed of as indicated. The kinds and quantities of the K powders on hand are as follows:

Smokeless powder on hand September 20, 1894.

Kind.	Amount.	Kind.	Amount.
	Pounds.		*Pounds.*
K 5, 25 m	13	K. C. 1	74¼
K. 7, 50 m	1	K. C. 2	36¾
K. 8, 50 m	1	K. C. 3	6
K 10, 50 m	21¾	K. D. 1	7¼
K. 10, 6 hexagonal	2¼	K. D 2	58¾
K 10, 7 hexagonal	5	K F. 1	1
K. A	1		
K. B	29½	Total	271¼

VELOCITY RANGES.

Small arm.—In the manufacture and development of smokeless powder for small arms it was necessary that means should be provided for ascertaining the velocity and pressure produced by powders of different kinds, and different forms of granulation, for the purpose of comparison

with powders manufactured by other parties in the United States and with foreign powders of a similar nature. A suitable range has been laid out on the plateau at the north end of the island, in the rear of the boat house, and a butt, protected by armor plates, has been built. The locality is sheltered on three sides, is not frequented, and can not be crossed except by persons coming along the breakwater leading from the lighthouse, which is in full view of those conducting the tests. Convenient semaphores have been arranged, by means of which signals are transmitted to the electrical laboratory, in which the chronograph is located.

Rapid-fire guns.—The Bureau has decided that it was advisable that the tests of the smokeless powder designed for rapid-fire guns should, if practicable, be made at this station instead of at Indian Head, as heretofore, as the transportation of the explosives was difficult and consumed much time. A range for the purpose has been established on Rose Island. Two of the unoccupied casemates in the old fortification (Fort Hamilton) have been cleaned out, repaired, floors laid, and suitable foundations put in, on which are mounted, in one a 1-pounder rapid-fire gun, and in the other a 6-pounder.

A butt formed of armor plates has been constructed, and a chronograph house erected.

The natural advantages offered by the dilapidated casemates and surrounding earthworks for the construction of a range were excellent, and a comparatively small expenditure of money has sufficed to produce results which would otherwise have been impossible.

It is believed that this range is not excelled for the purposes for which it is intended by any other in the country.

INSTRUCTION.

Officers.—The instruction of officers has continued during the past year upon the same general plan outlined in the last report. The scheme seems to work well, and has been extended so as to include instruction in the stowage and transportation of torpedoes on board ship, exercise in preparing the torpedo for action and placing it in the launching tube, the use of directors of different patterns, and explanations of the functions and uses of the various appliances and accessories which have been developed during the past year.

At present about three weeks are required for the course. The details visit Sag Harbor and Tiverton testing stations, where adjustments and trials of torpedoes are witnessed, and Providence where the Howell torpedo is manufactured. The time heretofore spent in Noyack Bay has been reduced, as much of the experimental work usually witnessed there can now be seen at the testing station here.

Since the date of last report 33 officers, including the present detail, have received the regular course of instruction. The officers, with rare exceptions, show great interest and are indefatigable in their endeavors to become thoroughly familiar with all of the details of the subject.

In addition to the regular detail, officers of the war college have received instruction; also the cadets of the cruiser *Bancroft*.

Seamen.—During the year 62 seamen have been under instruction, of whom 21 are now in attendance, 2 have been transferred to the general service not qualified, while 39 have been rated seamen gunners upon the completion of their course.

By order of the Bureau of Navigation, the period of instruction has been reduced to twenty-two weeks, which are allotted as follows: Eight weeks to torpedoes, seven weeks to electricity, four weeks to explosives, and three weeks to diving.

The course of instruction has been modified in essential particulars with the view of more fully adapting it to the present requirements of service. The time hitherto devoted to acquiring a knowledge of spar torpedoes and the details of manufacture of explosives has been greatly reduced. The men are now taught the object and use of the various articles which compose the automobile torpedo outfits; the construction, care, and handling of the torpedoes and their adjustment and preparation for action. They receive much practical instruction in the assembling room, the air-compressor room, and at the testing station, and are detailed from time to time for service on the *Cushing* and *Stiletto*. They thus become well qualified for the positions of leading men in the "torpedo crews" of seagoing ships.

In addition to performing the diving required by the exigencies of the work at the torpedo station, which has included the searching for and recovery of automobile torpedoes (which have accidentally gone to the bottom during practice), experiments made to determine the effect of explosions on living animals in submerged boats, and the care and inspection of the water pipes, etc., their services have been frequently called into requisition for submarine work upon the Government vessels and tugs attached both to this station and the training station, for which they do not receive the compensation allowed for such service performed by seamen attached to cruising vessels.

The instructor in diving, who had been here for several years, was discharged at his own request and his position has been filled most satisfactorily since the beginning of this season by a seamen who had received the regular course of instruction at this station.

I desire to call the special attention of the Bureau to the general good conduct and application displayed by the seamen sent here for instruction.

Rhode Island naval militia.—Eighty-two men of this force—one company from Newport and one from Bristol—were given three days' instruction while attached to the *Miantonomoh*, September 19, 20, and 21. The course included lectures and exhibit of spar torpedoes and appliances, practical exhibit of firing of spar torpedoes from launch, and lectures on Whitehead and Howell torpedoes.

PREPARATION OF MANUALS, ETC.

A complete description of the Whitehead 45 cm. torpedo, profusely illustrated, has been prepared for issue to the service. A book for the use of torpedo officers, giving detailed instructions in the care and handling, assembling and disassembling, etc., of whitehead torpedoes is now in print and will be ready for issue in a short time.

A description of the Howell torpedo is now ready for the printer, and plates are being prepared.

A description of the various forms of directors, with the accompanying plates, is ready for printing.

A drill book, suitably illustrated, for the various mounts used in the service for the Whitehead torpedo, has been prepared and is now being revised.

A handbook for seamen gunners on the subject of diving has been printed and will be ready for issue as soon as the plates can be made.

LIBRARY.

The cramped condition of the rooms used for library purposes makes it impossible to keep the card catalogue in shape and books properly shelved and arranged. It is hoped that during the present year a way may be found to give the library the space it needs.

During the past year 152 volumes have been added to the library, and it now contains a total of 3,754 volumes. The card catalogue has been increased as the added volumes demanded.

The policy of filling up incomplete volumes by exchange or purchase has been continued as heretofore.

SANITARY CONDITION.

The general sanitary condition of the island continues excellent, there having been but one case of serious illness during the past year, and that was in no way attributed either directly or indirectly to local causes.

Very respectfully submitted.

G. A. CONVERSE,
Commander, U. S. Navy,
Inspector of Ordnance, Torpedo Station.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

A.

REPORT RELATIVE TO TESTS MADE WITH TORPEDO NETS.

NAVAL TORPEDO STATION,
Newport, R. I., November 28, 1893.

SIR: I respectfully submit the following report relative to the tests made with torpedo nets during the past season:

The trials to determine the relative strength of different torpedo nets were discontinued when the *Destroyer* left this station. Four shots were fired against them from the submarine gun aboard that vessel. No comparisons can be made from the results thus far obtained.

Three of the nets under consideration are of American design, made by the Midgley Wire Belt Company, of Beaver Falls, Pa., and one is of the Bullivant pattern, obtained abroad by the Bureau. They may be designated 1, 2, 3, and 4, respectively.

The nets of the Midgley pattern are made up of a system of vertical webs and horizontal strands. The webs are composed of successive spirals of wire running crosswise, each one with its turns or convolutions woven into the turns of the one on either side of it, thus forming a flat belting. The strands are three-braided of equal bundles of untwisted wires. The crossings of webs and strands are fastened in the manufacture by opening out the strands of the braid parallel to each other for a length equal to the width of the web and weaving one spiral of the web around each strand of the braid.

No. 1 is a light net of ungalvanized steel. No. 2 is the next heaviest in weight. The material is steel music wire ungalvanized, such as is used for pianos and harps. No. 3, the next in weight, is of nickel steel, which was furnished to the manufacturers by the Bureau. No. 4 is of the usual Bullivant type. It is composed of 850 7-stranded galvanized steel wire grommets of 6½ inches mean diameter. The wire measures 101 mils, or between Nos. 12 and 13 B. W. G. The grommets are arranged in thirty-four horizontal rows of twenty-five to the row. Each grommet is joined to its neighbors by four one-half-inch galvanized steel rings, 1½ inches in diameter. The table below gives complete data of all nets. The columns of tensile strength of materials and strength of nets and strands are as furnished by Mr. Midgley.

The projectile of the submarine gun which was used against the nets weighed about 1,500 pounds. There was no feasible method of obtaining the striking velocity and thus calculating the force of the blow, but by using the same powder charge and placing the nets at known distances relative results would be obtained. What was actually attempted was to fix the powder charge, then taking one net at a time change its distance until a point was reached at which the projectile just failed to penetrate. The order of strength of the different nets would then be in the inverse order of the distances. The nets, weighted at the foot with chain, were suspended from a suitable spar and placed across the range of the gun. They were otherwise unsupported. It is believed that the conditions approximated those of actual service.

No. 1 net was used first at a distance of 100 feet from the muzzle of the gun. The powder charge was 12 pounds. The projectile perforated the net, breaking through one web and one-third through the adjoining one on either side. The two strands between which the projectile passed were bruised and had a few wires broken, but were otherwise uninjured.

It was decided that 12 pounds was not a sufficient charge to give the projectile a regular flight. The charge used on former trials was 25 pounds. On the next shot, accordingly, the charge was increased to 15 pounds and the distance to 200 feet, still using No. 1 net. The projectile perforated the net. One web was broken through. The adjoining webs were bruised and stretched but were not broken. Two-thirds of the wires in each of the adjoining strands were broken.

The third shot was fired with the same charge, 15 pounds, using No. 2 net at 200 feet. The projectile perforated the net. One web was broken and an adjoining one broken through one-third its width. The strand on either side was a little bruised, but was practically uninjured.

The fourth shot was similar to the above, but with the net moved out to 300 feet. The shot missed the net.

The only conclusion to be drawn from an inspection of the three perforations is that the web, which is the main feature of the system, is the element of weakness in the three nets tried. The reason of this is apparently that the strain is first brought on the edge of the web and ruptures it before the full strength is developed. Though the strands are of greater total strength than the webs, still they seem by reason of their compactness to offer their full resistance at once and thus to sustain more than their proportional share of the strain at the expense of the webs. There seemed to be no rendering whatever at the crossings of webs and strands. From this reasoning it seems probable that a net comprised entirely of braided strands with their crossings woven together would offer more resistance than the present form, though it would probably not roll as well. (Sketch appended.)

The nets are still in good condition for further tests. A rupture at a given point does not seem to affect the remainder of the net in anyway. As the probabilities are largely in favor of not hitting in the same place twice, one net can be fired at a great many times. The holes will be repaired before the nets are used again.

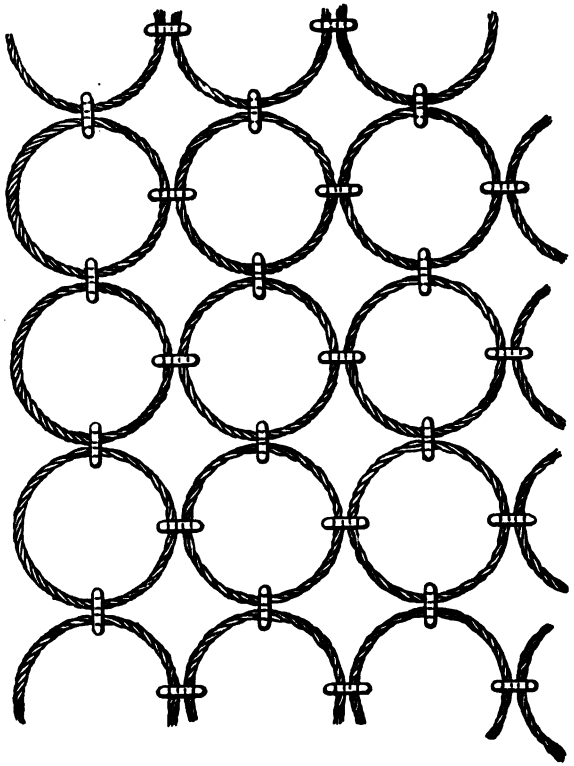
The rusting referred to in a memorandum of September 27 last has been prevented from increasing by keeping the nets well coated with asphalt. The corrosion of the nickel-steel net has been traced to acid contained in the storage battery of the Sims-Edison torpedo. The battery was very improperly packed, with free acid remaining in the cells, the shipper trusting to the legend "this side up with care" to save the contents. By splicing the corroded strands the net will still be useful for such tests as may be required.

Unless material can be found which is practically noncorrodible, it will not be advisable to use fine wires for either webs or strands on account of the larger proportional surface exposed for a given strength. At the same time flexibility is a desideratum in the handling. No. 18 B. W. G. would seem to be a reasonable limit.

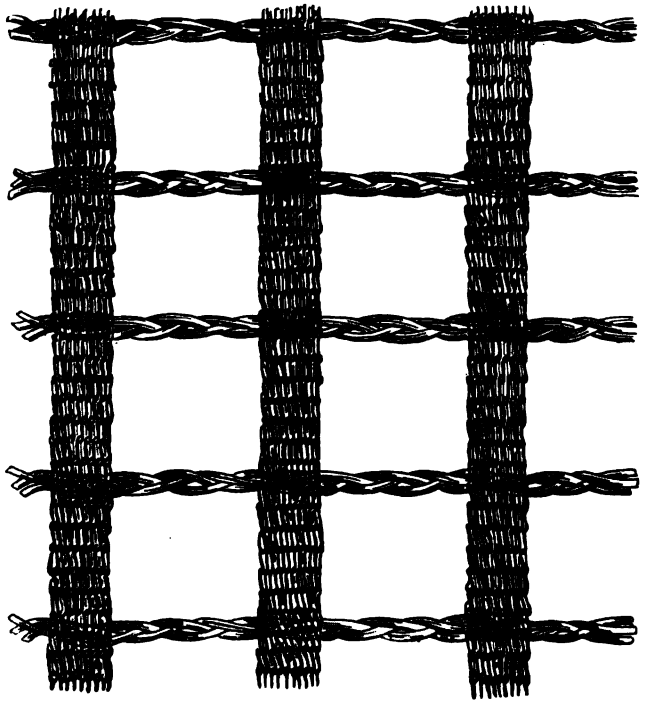
Very respectfully,

G. A. CONVERSE,
Commander, U. S. Navy,
President of Torpedo Board.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.



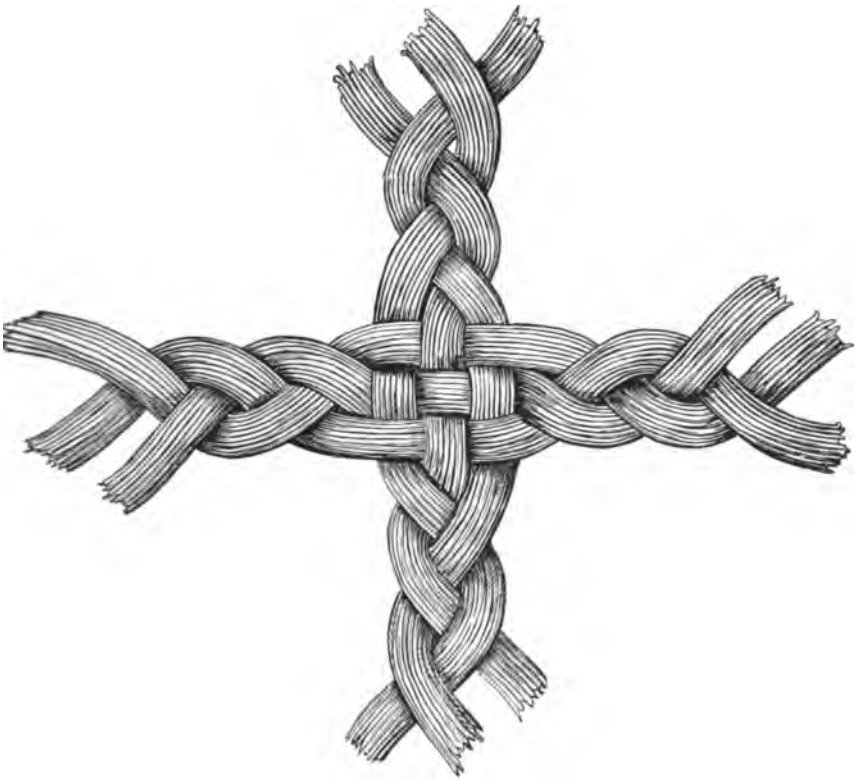
The Bullivant net.



The American net.

TORPEDO NETS.

Scale, 1½ = 1 foot.



TORPEDO NET, BRAIDED WEBS AND STRANDS, TORPEDO STATION, NEWPORT, R. I.
NOVEMBER 29, 1893.

Two-third size.

Torpedo nets.—Table of weights and dimensions.

	Length.	Depth.	Weight.	Weight per square foot.	Tensile strength of material per square inch.
	Feet.	*Feet.*	*Pounds.*	*Pounds.*	*Pounds.*
1. Light steel	20	10	200	1.00	280,000
2. Music wire	15	20	460	1.53	275,000
3. Nickel steel	15	20	625	2.08	200,000
4. Bullivant	15	20	660	2.20	.....

	Webs.								Strands.					
	Number.	Width.	Interval center to center.	Size of wire.	Equivalent B. W. G.	Turns of spirals in width.	Number of spirals per foot.	Strength.	Number.	Interval, center to center.	Size of wire.	Equivalent B. W. G.	Number of wires in braided strand.	Strength.
		In.	*In.*	*Mils.*				*Tons.*		*In.*	*Mils.*			*Tons.*
1. Light steel	33	1.5	7.3	65	16	10	32	2.8	19	6.7	43	19	30	3.6
2. Music wire	20	3.0	9.0	101	12–13	9	14	4.6	34	7.3	40	19–20	60	7.0
3. Nickel steel	20	2.8	9.0	122	11		12	4.5	34	7.3	43	19	60	6.9
4. Bullivant	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

B.

EXPERIMENTS REGARDING THE EFFECT OF HEAVY EXPLOSIVES UPON ANIMAL LIFE.

NAVAL TORPEDO STATION,
Newport, R. I., November 8, 1893.

SIR: Referring to the Bureau's letter of October 28, relative to a series of experiments having for its object the determination of the effect upon animal life of the explosions of a heavy charge of gun cotton under water, the animals being placed in a closed vessel and submerged, and asking if I know of any experiments which have been made deciding this point, I have to state:

In 1874 an extended series of experiments, generally referred to as the "Oberon experiments," was carried out at Stokes Bay, England, under the direction of a special committee for the purpose of ascertaining the effects of heavy explosives upon the bottoms of ships of the *Hercules* type. The charge used was 500 pounds of compressed gun cotton, and in the first experiment was placed at a horizontal distance of 100 feet from the side of the vessel.

In the report of the result of the first experiment, which took place on the 4th of August, 1874, the London Engineer states as follows: "On boarding and examining the vessel she was found to be leaking slightly from some injury effected on the condenser. In no other respects had she suffered seriously * * * but little injury appeared to be done generally, and the live stock, consisting of sheep, fowls, and rabbits, were flourishing."

These experiments were continued, using the same charge as above, but locating it at horizontal distances of 80, 60, 50, and 28½, feet, and finally vertically underneath the outer skin of the ship. Unfortunately, I am unable to find among the records of this station full accounts of these trials, but as it is stated that the conditions were identical in every succeeding experiment, with the exception of the distance of the charge from target, it is believed that the animals were on board the *Oberon* in all cases until death or injury resulted, and therefore that the information desired by the Bureau can be obtained from the official reports of these experiments.

Should the Bureau desire me to conduct the experiments referred to, I would recommend that I be authorized to use the hull of one of the early type of "Lay torpedo" now at this station, buoying it from spars and conducting the experiments in the outer harbor, instead of constructing a special tank and using the crane at the end of the dock as suggested.

Very respectfully,

G. A. CONVERSE,
Commander, U. S. Navy,
Inspector of Ordnance, in charge.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

NAVAL TORPEDO STATION,
Newport, R. I., December 13, 1893.

All preparations for conducting the experiments directed by the Bureau havi for their object the determination of the effect of large charges of explosives up animal life in submerged vessels were completed on the 9th instant.

As the data, to be valuable, should be fairly accurate, it is essential that the co ditions of the sea should be favorable for mooring the boat in its position and taki measurements therefrom for locating the mines. Moreover, the sea should be r sonably smooth in order that the boat may be raised to the surface and the manh covers removed for an inspection of the animals contained therein as speedily possible after the explosion has taken place.

While the effect of the explosion upon the boat would undoubtedly vary with t position of the boat in reference to the mine—that is, whether the boat presents end or broadside section to the mine—it is assumed that the object is to place boat in the position in which the effect will be the maximum, and it is the intenti accordingly, to have the mine on the broadside.

The boat, as fitted, contains three compartments, in which it is intended to pl two cats, two rabbits, two roosters, and two pigeons.

The shell of the boat has been carefully measured, and its computed strength, fi the data obtained, is 90 pounds per square inch.

The experiments will be commenced as soon as the weather moderates and hur to a rapid conclusion.

Very respectfully,

G. A. CONVERSE,
Commander, U. S. Navy,
Inspector of Ordnance, in charg

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

NAVAL TORPEDO STATION,
Newport, R. I., December 22, 18

SIR: I inclose herewith, for the information of the Bureau, a memorandum o first experiment made with the object of determining the effect of submarine e sions on animal life.

The shell of the Lay boat used in this experiment had been prepared with g care, and the joints, which, after the experiment, were found to be leaking, were r in the manner heretofore employed in boats of this description—that is, the pl were tightly screwed down by means of numerous small screws, with a rubber ga interposed between the surfaces. It is my intention in future experiments to r these plates and calk the seams, leaving only the hand-hole plates removable, these will be made double.

Owing to the great exposure to which both officers and men—particularly the ter, who are engaged in diving—are subject, and also to the difficulty of accura placing both the boat and the mine, I would suggest, unless there are urgent rea to the contrary, that these experiments be deferred until the season is more favor for this work. I may add that the weather during this month has been exceptio severe for this time of the year.

In the meantime preparations for the continuance of the experiments are in p ress and everything will be held in readiness for suitable opportunities for carr on the outside work.

Very respectfully,

G. A. CONVERSE,
Commander U. S. Navy,
Inspector of Ordnance, in char

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

NAVAL TORPEDO STATION,
Newport, R. I., March 12, 18

SIR: The experiments for determining the effect on animal life of subma explosions of gun cotton, which were begun in accordance with the Bureau's inst tions of October 28, 1893, have been carried to the limit of the means employed.

A preliminary memorandum was submitted on December 21 last giving the ef of the first explosion of 80.7 pounds (dry weight) of wet gun cotton at a distance 431 feet. A copy of the memorandum is appended. An equal charge has now b exploded at distances of 305, 200, 150 (two charges), 100, and 80 feet. The submer ence in each case was the same for both mine and boat, 15 feet. The boat w

moored in from 8 to 7½ fathoms in the different experiments, the mine in from 7 to 7½ fathoms. The mine was always as nearly abeam of the submerged boat as the varying wind and current would permit. In the fifth experiment, distance 150 feet, the mine was broad on the bow of the boat. In no other case did the bearing vary much from abeam. Du Pont gun cotton was used in the first four experiments. In the last of these, for some reason unexplained, which will form the subject of future investigation, there was not a perfect detonation. Nitrous fumes rose with the disturbed water, which was much less in volume than in other explosions, and the shock was very slight. It was decided to repeat the experiment at this distance. Torpedo station gun cotton was used in the last three explosions, which were as nearly perfect as possible, each one seeming to be in shock and amount of water thrown up a little in excess of its predecessor. Photographic views of the last six explosions are forwarded with this report.

The changes to be noted in the fittings of the boat, as described in the memorandum, were as follows: The cover plates (Sheet I), extending between the extreme rings A A, which were formerly secured on a rubber gasket with small tap screws, were now strap riveted the entire length. The hand-hole plates, instead of being set up with inside toggles and turnbuckles, were held down firmly on the gaskets by half-inch screw bolts tapping into a strengthening ring riveted around the inside of the opening. The five section joints, A, nearest the middle of the boat were made tighter by rubber gaskets stretched over the outside and held in place by wrought-iron bands, 4 inches by one-fourth inch drawn together on top by lugs and screw bolts. The air pipes shown near the ends of the boat were not used. The boat was not closed for longer than one and one-fourth hours on any occasion and there were never more than five small animals to 135 cubic feet of air. The holes for the pipes were permanently plugged.

The method of slinging is shown in Sheets II and III. By using a 32-foot launch and heavy slings it was contemplated to float the shell even in case of collapse. The arrangement, moreover, proved a simple means of handling and submerging the boat. The weights represented hanging by lines were 13-inch spherical shell weighing each one, with its spindle and ring, about 225 pounds. The buoyancy of the boat, with these weights removed, was 500 pounds, with the weights hanging there was a negative buoyancy of 400 pounds. The bands on the outside of the boat added about 200 pounds to the weight as previously reported.

The second experiment was made on March 1, on the west side of the island, 700 feet from the new gun-cotton factory. Charge in mine 80.7 pounds (dry weight) Du Pont gun cotton. Distance from boat to mine 305 feet. Calculated pressure, Gen. Abbot's formula, 81 pounds per square inch. This was the estimated collapsing strength of boat under sustained pressure. Boat in 8 fathoms, mine in 7 fathoms, submergence 15 feet, both mine and boat. The explosion was good. There was no injury to the boat or animals.

The third experiment was made on the same day. The only change was in the distance between mine and boat, which was reduced to 200 feet. The calculated pressure was 147 pounds per square inch. The explosion was good. There was no injury to boat or animals.

The fourth experiment was made on March 2. The distance was reduced to 150 feet, at which the calculated pressure was 219 pounds per square inch. The explosion was not good, detonation apparently incomplete, as before stated. There was no injury to boat or animals.

The fifth experiment was made on March 3, and was a repetition of the last except that torpedo station gun cotton was used. The mine in this case bore broad on the starboard bow of the submerged boat. The explosion was highly successful. There was no injury to boat or animals.

The sixth experiment was made on March 5. Boat and mine were each in 7½ fathoms of water. The distance was 100 feet, at which the calculated pressure was 387 pounds per square inch. The explosion was, if anything, more severe than the preceding. The photographic view was taken too soon, the column of water not having reached its highest point. This is indicated in the view itself by the comparative solidity of the mass upheaved. There was no injury to boat or animals.

The seventh experiment was made the same day. All the conditions were the same, except that the mine was now, on account of conditions of wind and tide, on the port side of the boat and the distance was 80 feet. The calculated pressure exerted was 528 pounds per square inch. The explosion was the severest of the series. When the boat was raised the shell was found to be depressed in a number of places, as very clearly shown in five photographic views appended and in blue print Sheet IV. No leaks were developed. The animals were entirely unhurt, but were well spattered with the half-inch or so of rather dirty water that was in the boat during the experiments. The forward compartment (the right hand end, Sheets I and IV) to the first bulkhead B contained a rabbit and a chicken cock. They were probably on the planking covering the ballast, which was dry before the

explosion. The middle compartment contained two pigeons. They were in an open box with slat cover resting on wooden battens between the bulkheads (Sheet I). The after compartment contained a large muscular cat that had been running wild before caught. The idea was to have as great a difference of vitality in the animals as possible in order to give the margin within which the stronger animals might have survived notwithstanding the killing of the weaker ones.

The great excess of the deforming pressure over the estimated collapsing strength of the shell is explained by the marked difference in effect of an instantaneous pressure and a continuously sustained pressure. Numerically equal static and dynamic pressures, as determined by the compression of copper disks, may exert very different effects on steel or iron when account is taken of the time and space through which the force must act before deformation can take place.

The present condition of the shell of the boat makes it certain that its limit of strength short of rupture has been reached. Further experiments would result in drowning the animals without demonstrating any new fact. Nothing further will therefore be done until the wishes of the Bureau in the matter are known.

The data of the several experiments are shown in tabular form, Appendix A; the calculation of the pressures, by Abbot's formula, is given in Appendix B; prints, Sheets I to IV, show the arrangements for the experiments; photographic views 1 to 6 show the explosions in order, except the first one of last December, and views 7 to 11 show the boat in its present condition. A copy of the memorandum of December 21 is also appended.

Respectfully submitted.

G. A. CONVERSE,
Commander, U. S. Navy,
President Naval Torpedo Board.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

APPENDIX A.

Date of experiments.

Number.	Date, 1893-'94.	Gun cotton (dry weight).	Du Pont or torpedo station.	Distance.	Calculated pressure.	Water at boat.		Water at mine.		Bearing of mine from boat.	Character of explosion.
						Depth.	Submergence.	Depth.	Submergence.		
				Feet.		*Faths*	*Feet.*	*Faths*	*Feet.*		
1	Dec. 15	80.7	D. P.	431	50	8	15	7	17	.....	Good.
2	Mar. 1	80.7	...do	305	81	8	15	7	15	Starboard beam.	Do.
3	Mar. 1	80.7	...do	200	147	8	15	7	15	....do	Do.
4	Mar. 2	80.7	...do	150	219	8	15	7	15	....do	Indifferent.
5	Mar. 3	80.7	T. S	150	219	8	15	7	15	Starboard bow.	Very good.
6	Mar. 5	80.7	...do	100	387	7.5	15	7.5	15	Starboard beam.	Do.
7	Mar. 5	80.7	...do	80	528	7.5	15	7.5	15	Port beam.	Excellent.

APPENDIX B.

The formula used in the first experiment (See Appendix B of memorandum) connecting pressure and distance was

$$P = \sqrt[3]{\left\{ \frac{6636\,(0 + 135)\,C}{(D + 0.01)^{2.1}} \right\}^2}, \text{ or very near}$$

$$P = \frac{K^{\frac{2}{3}}}{D^{1.4}}, \text{ where } \log K = 8.08096.$$

D	Log D	1.4 log D	$\frac{2}{3}$ log K	Log P	P
305	2.48430	3.47802	5.38731	1.90929	81
200	2.30103	3.22144	5.38731	2.16587	147
150	2.17609	3.04653	5.38731	2.34078	219
100	2.00000	2.80000	5.38731	2.58731	387
80	1.90309	2.66433	5.38731	2.72298	528

MEMORANDUM OF EXPERIMENT ON EFFECT OF SUBMARINE EXPLOSION ON ANIMAL LIFE.

In accordance with instructions contained in the Bureau's letter of October 28, 1893, the following experiment was made on the 15th instant to determine the effect upon animal life of the explosion of gun cotton under water, the animals being placed in a closed vessel and submerged.

The shell of station Lay torpedo No. 1 was used for inclosing the animals. (See print, Sheet I, appended.) It was 27 feet 8 inches in length and 3 feet in maximum diameter, displacing approximately 4 tons. Its weight empty was 2,400 pounds, with inside ballast 3,400 pounds. The interior air space was 135 cubic feet. The material was wrought iron, varying in thickness from 0.14 inch to 0.17 inch. It was strengthened internally by 8 rings, each formed of two pieces of angle iron, 1¼ by 1¾ by ¼ inch, riveted together to make a T; and two bulkheads of five-sixteenths-inch iron. The inside ballast was boarded over and bolted to hold it in place. The bulkheads were pierced to give free air circulation throughout the length. A hand hole communicated with each of the three compartments. Wire netting covered the openings inside the plates. An iron pipe 18 inches long and about 7 feet distance from each end admitted air when the hand holes were closed. Prior to submerging the pipes were removed and the holes plugged.

The torpedo boat thus fitted was submerged by 6,200 pounds of fixed outside ballast and 900 pounds of movable ballast. The fixed ballast was lead pigs in 12 wooden boxes lashed under the boat, two abreast (Sheet II, appended). The movable ballast was four 11-inch shot suspended to the boat by lines. A spar at the surface supported the boat at the required submergence by distance lines at the ends. The shot could be raised by hauling lines leading up to the spar. Buoy lines near the middle were fitted in case the distance lines parted by the collapse of the shell.

The following is a summary of the weights and displacements. It will be seen that the reserve buoyancy with the shot hauled up was 700 pounds. With the shot attached the negative buoyancy was 200 pounds.

	Lbs.	Lbs.
Weight of shell	2,400	
Inside ballast	1,000	
Outside ballast, fixed	6,200	
Outside ballast, movable	900	
Total weight		10,500
Displacement of shell	9,200	
Displacement of outside ballast	1,100	
Total displacement		10,300
Buoyancy, negative		200

At the time of the experiment the boat was moored 700 feet from the sea wall on the west side of the island, the axis lying east and west. The depth of water was 50 feet, the submergence 15 feet. It contained two rabbits, two pigeons, two chicken cocks, and a cat. At a distance of 431 feet south of the boat was moored a charge of 80.7 pounds (dry weight) of gun cotton in a wooden case. The actual weight wet was about 105 pounds. The primer consisted of six dry blocks in a tin exercise case. Wood is not recommended as a case for submarine mines, as it absorbs a portion of the energy of the explosion. This loss, however, is small with large charges, and is not believed to have been material on this occasion. The charge was intended to be submerged 15 feet, but was swept under 1 to 2 feet by the strength of the current. The depth of water was 50 feet.

When all was ready the wires were connected and the charge detonated. The resulting upheaval of water was about 50 feet in diameter and 20 feet in height. It was followed by a second upheaval more widespread than the first and of much less height. The water in the second wave was much discolored.

An attempt was at once made to raise the boat by hauling up the shot used to submerge it. The distance lines were found to have parted, indicating that water had entered the shell. Air bubbles were rising to the surface. The hauling lines could not be moved and the buoy lines were taut. The boat was on the bottom.

On the following day, Saturday, and on Monday, divers worked at removing the outside ballast and weighing the shell. It was raised by a winch and hawsers worked from a platform rigged athwart two heavy launches. There were found to have been leaks through some of the bolt holes in the hand-hole plates through which the toggle bolts passed, and in places along the seams of the cover plates. These latter are 30 inches wide and run nearly the whole length of the boat. All bolt holes were closed with washers and red lead putty. The joints were made with rubber gaskets. The boat was tested by internal air pressure before launching, and

by submerging in shoal water before the trial. It was afloat and awash for six days prior to the test and had made no appreciable amount of water. No air bubbles were observed on submergence at the time of the test. After the explosion they were rising in continuous small streams. The air was apparently not entirely exhausted up to the time the boat was raised, as bubbles were still slowly rising, though the water was up to the hand hole when the plate was removed. The animals were dead, apparently from drowning.

The considerations governing the choice of distance for the explosive charge were the following: By the Bureau's letter the closed vessel was to be capable of withstanding an exterior pressure of 50 pounds to the square inch. Its minimum computed strength was 81 pounds per square inch. (Computation appended, marked A.) General Abbot's formula connecting pressure and distance in submarine explosions gives 431 feet and 305 feet respectively as the distances at which pressures of 50 pounds and 81 pounds per square inch will be exerted by the explosion of 80.7 pounds of gun cotton. (Computation B.) Lieut. Col. Bucknill's formula gives 1,453 feet and 897 feet respectively for the above pressures. (Computation C.) The two formulæ agree at 17 feet, giving pressures of about 4,600 pounds. While either may be used near that distance, it seems probable from experience gained at this station that Abbot's formula is much nearer correct for greater distances. It was decided therefore to adopt in the first experiment the distance indicated by Abbot's formula as giving a pressure of 50 pounds to the square inch, viz, 431 feet.

As the shell itself does not seem to have been injured in this experiment, an attempt will be made to make the seams tighter by riveting and otherwise, and on the next test it will be moved closer to the charge.

TORPEDO STATION, *December 21, 1893.*

APPENDIX A.

Prof. Rankine (Applied Mechanics, seventh edition, article 287) gives as the collapsing strength of thin wrought iron cylinders this formula:

$$q = 9{,}672{,}000 \frac{t^2}{ld} \text{ nearly,}$$

where q = collapsing pressure in pounds per square inch:
t = thickness of metal
l = unsupported length
d = diameter
} All in same units of measure.

In this case t (minimum) = 0.14 inch; l (maximum) = 65 inches; d (maximum) = 36 inches.

9,672,000	log 6.98552	log 6.98552
0.14	log 9.14613	2 log 8.29226
65	log 1.81291	colog 8.18709
36	log 1.55630	colog 8.44370
q = 81.0		log 1.90837

Therefore minimum collapsing strength of shell = 81 pounds per square inch.

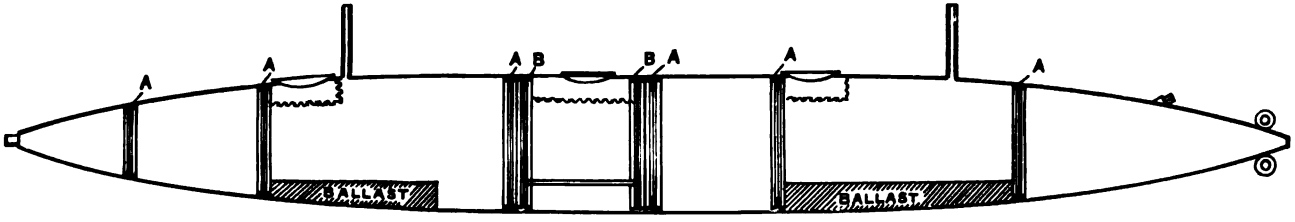
APPENDIX B.

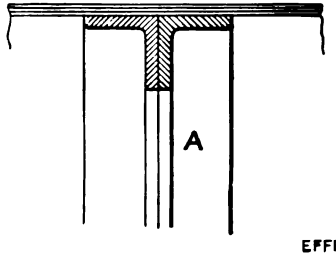
Gen. Abbot (Professional Papers No. 23, Corps of Engineers, 1881, p. 86) gives as the pressure exerted at a given distance under water by the explosion of a charge of gun cotton, this formula:

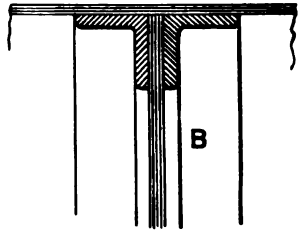
$$P = \sqrt[3]{\left\{\frac{6636\,(\theta + 135)\,C}{(D + 0.01)^{2.1}}\right\}^2}$$

where P = pressure in pounds per square inch.
θ = angle in degrees between nadir of charge and line from charge to target.
C = charge in pounds.
D = distance in feet.

SHEET I.



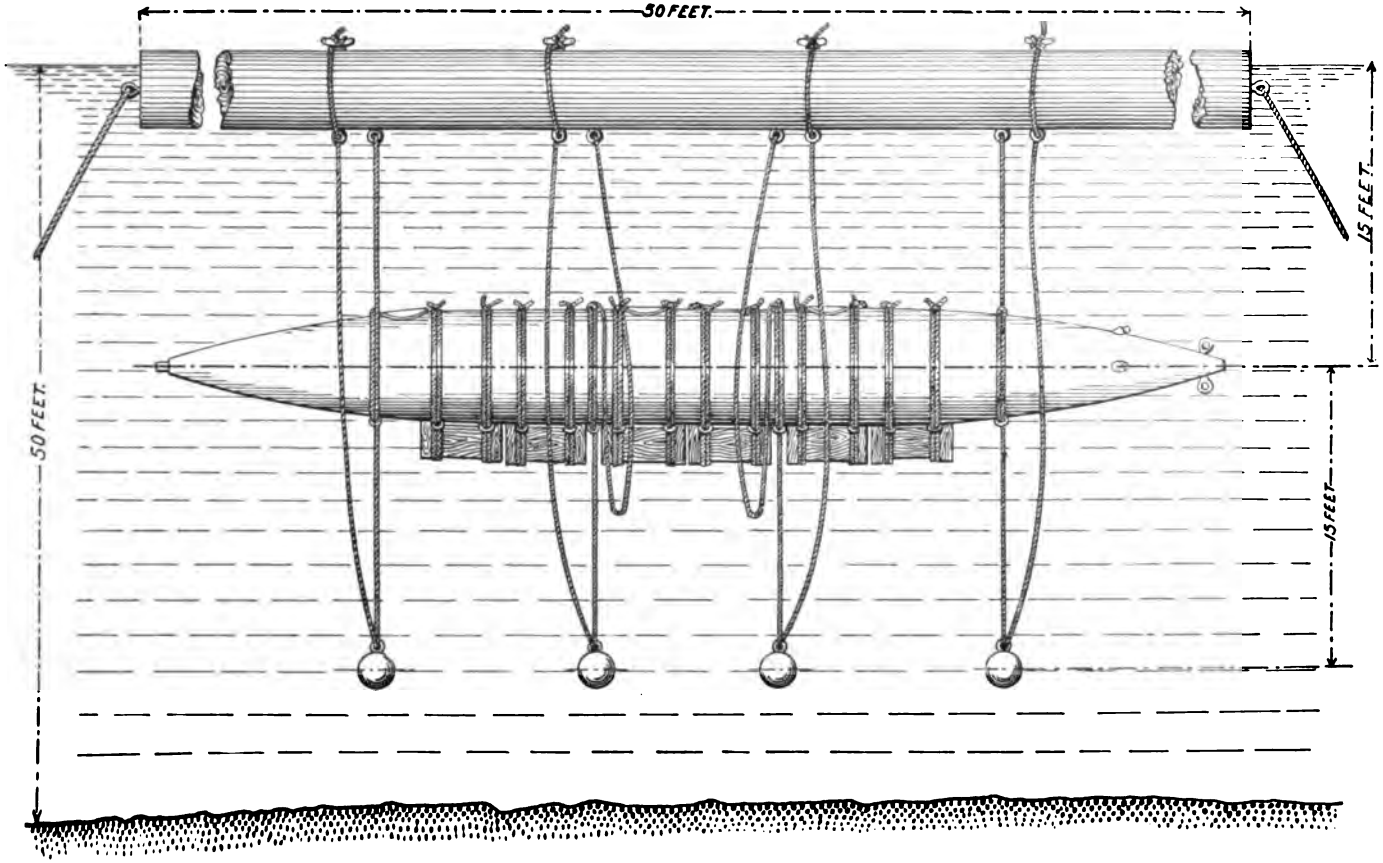




EFFECT OF SUBMARINE EXPLOSION ON ANIMALS IN SUBMERGED TANK. DECEMBER, 1893.
Scale, $\frac{1}{8}'' = 1$ foot.

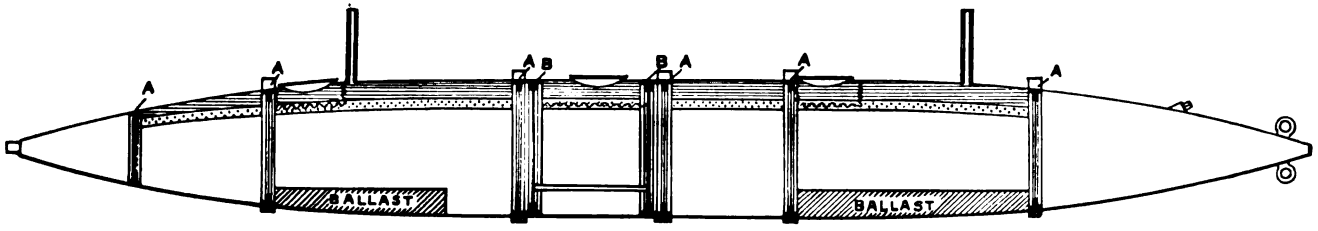
I

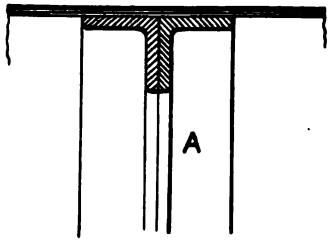
SHEET II.

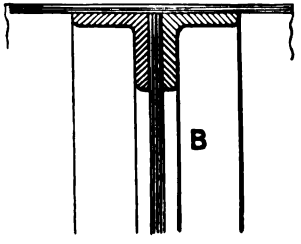


OF SUBMARINE EXPLOSION ON ANIMALS IN SUBMERGED TANK. DECEMBER, 1893.

SHEET I.



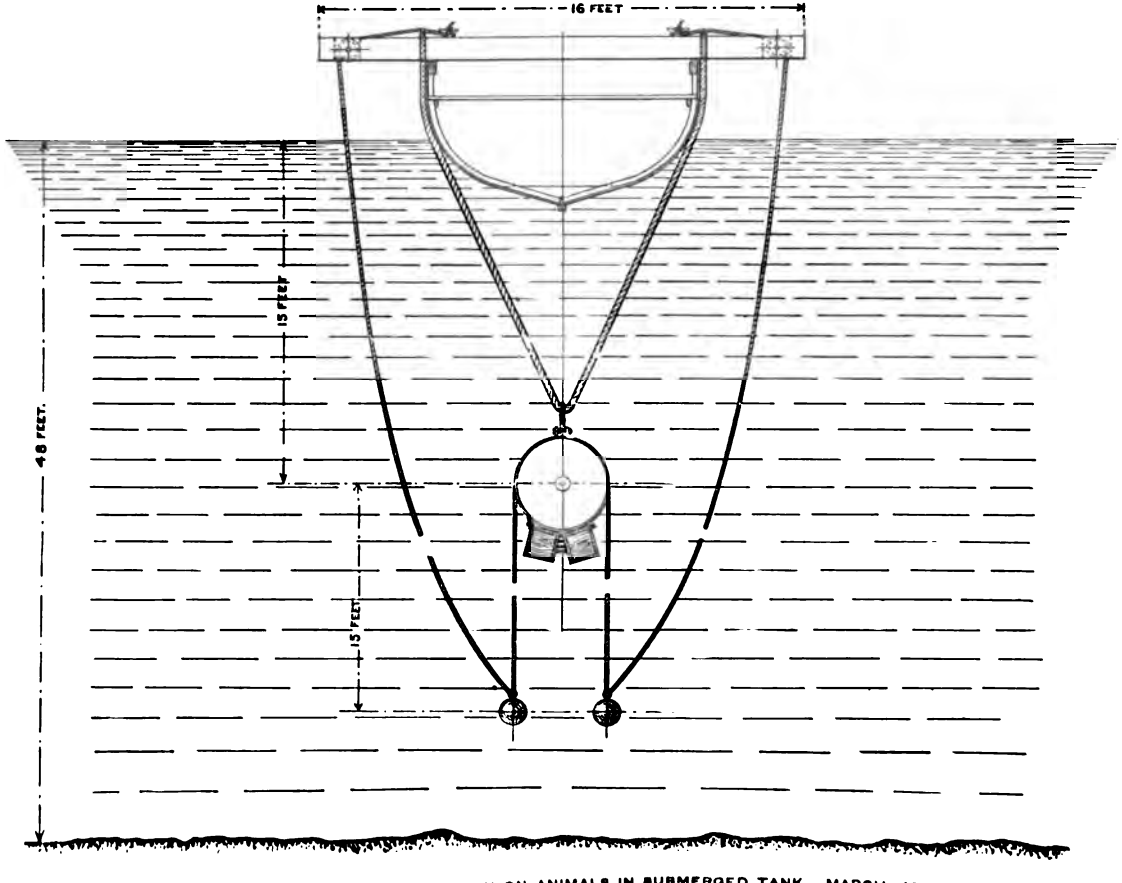




EFFECT OF SUBMARINE EXPLOSION ON ANIMALS IN SUBMERGED TANK. MARCH, 1894.

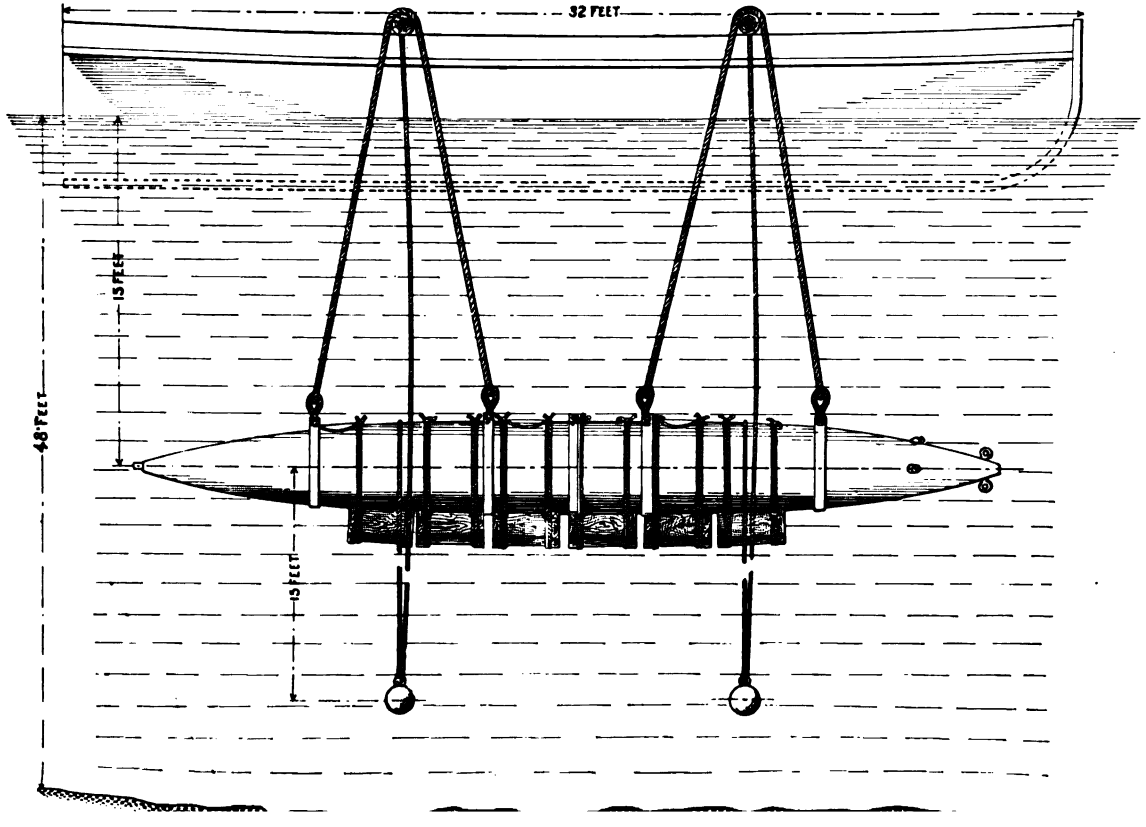
Scale, $\frac{1}{4}'' = 1$ foot.

SHEET II.



EFFECT OF SUBMARINE EXPLOSION ON ANIMALS IN SUBMERGED TANK. MARCH, 1894.

SHEET III.



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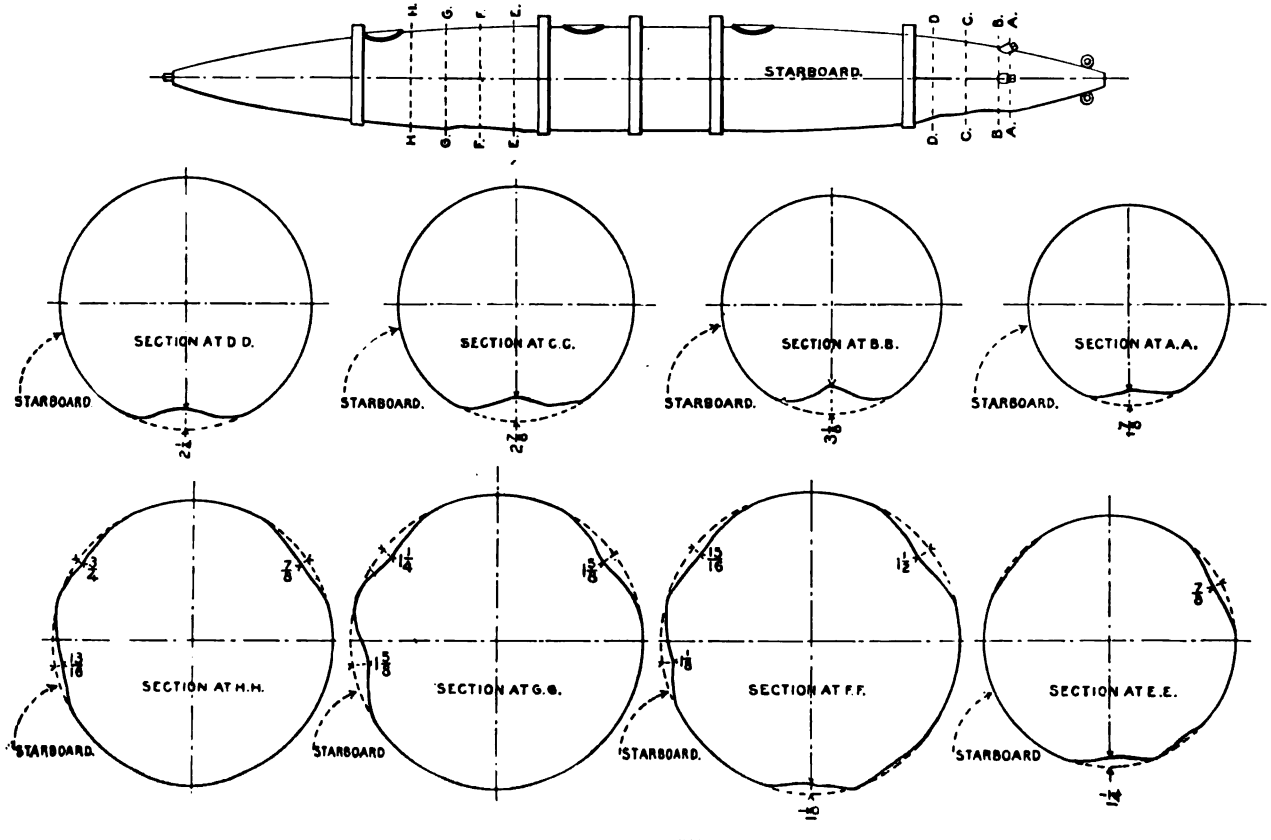
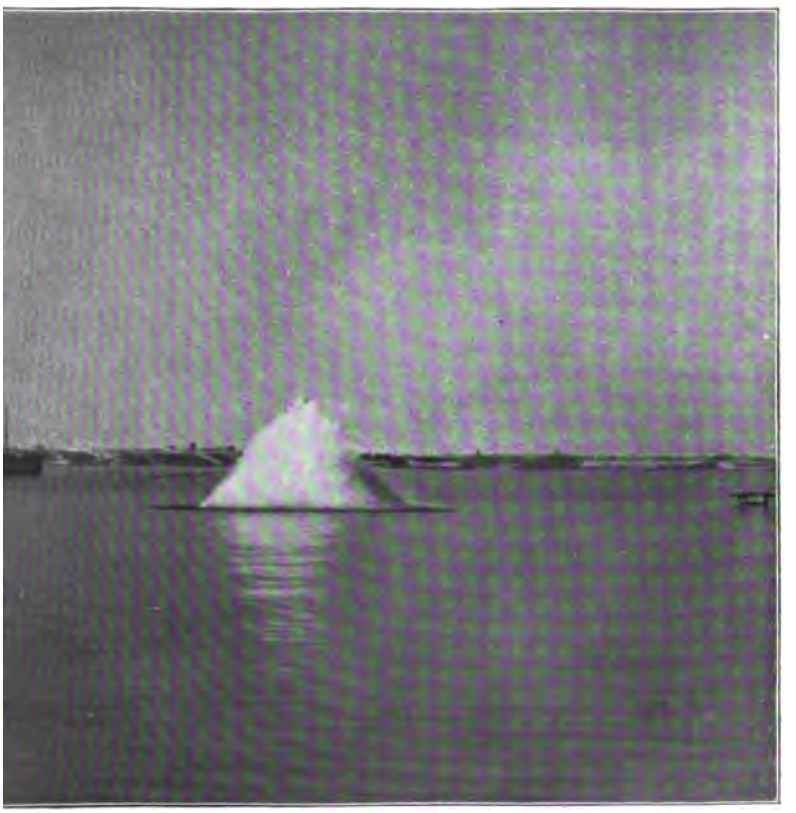
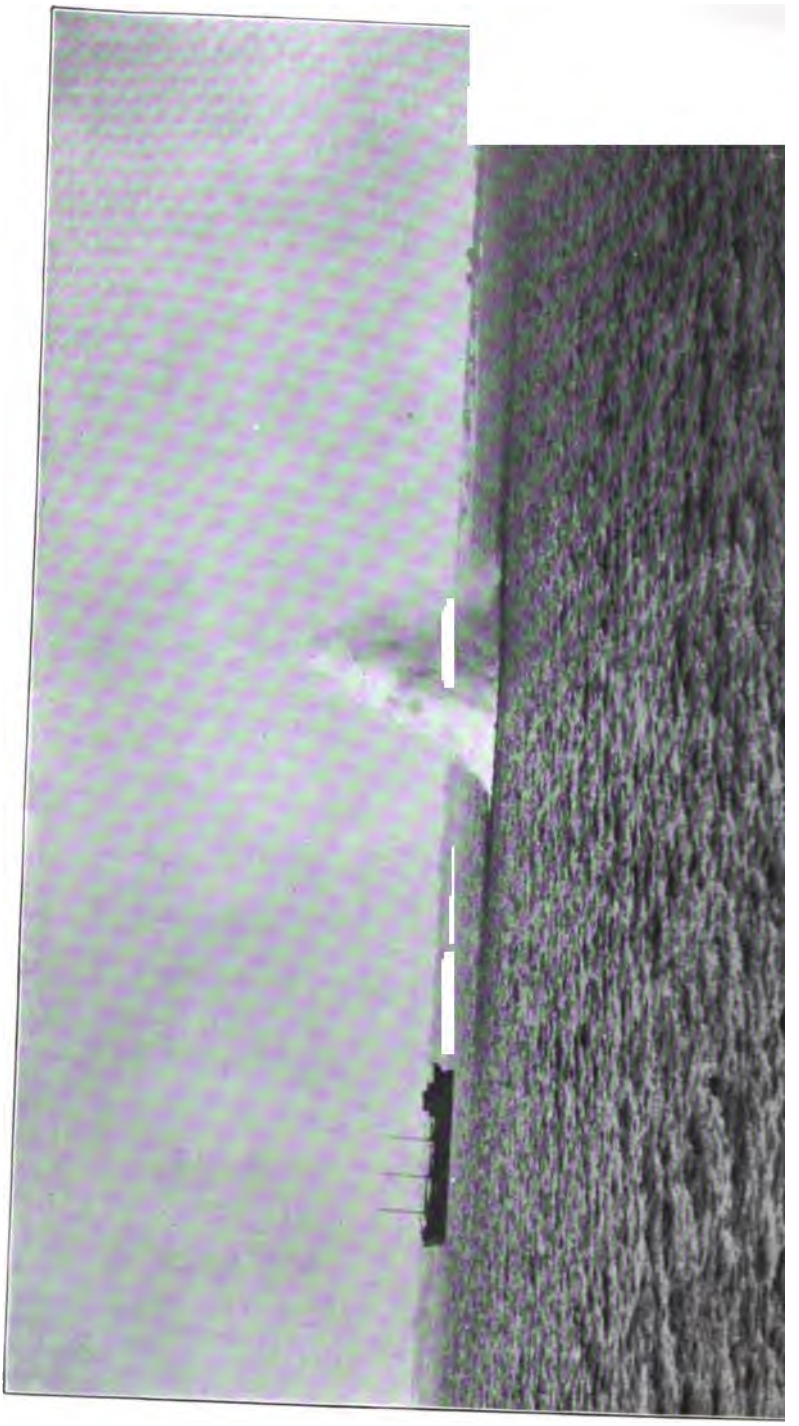


EFFECT OF SUBMARINE EXPLOSION ON SUBMERGED TANK. MARCH, 1894.

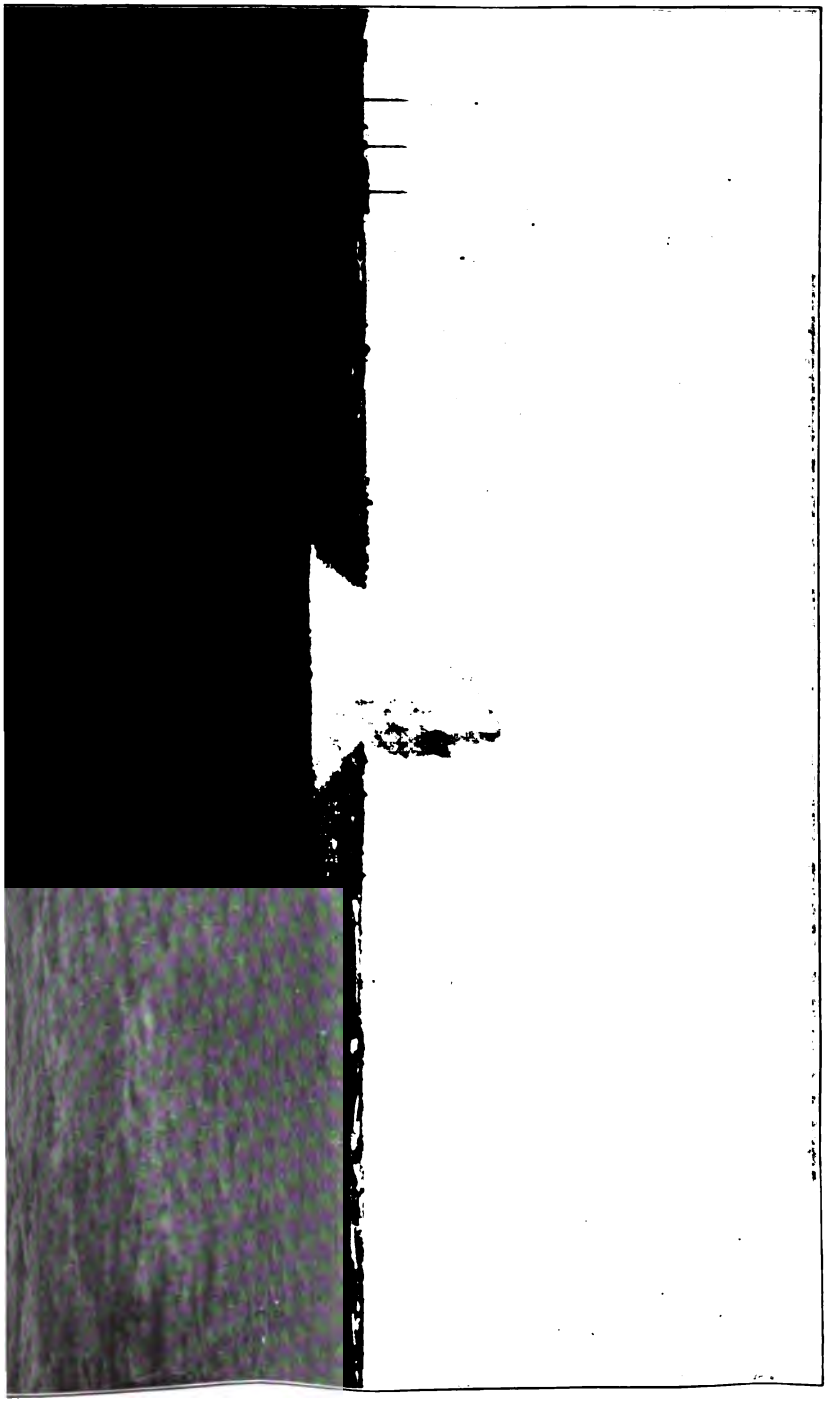


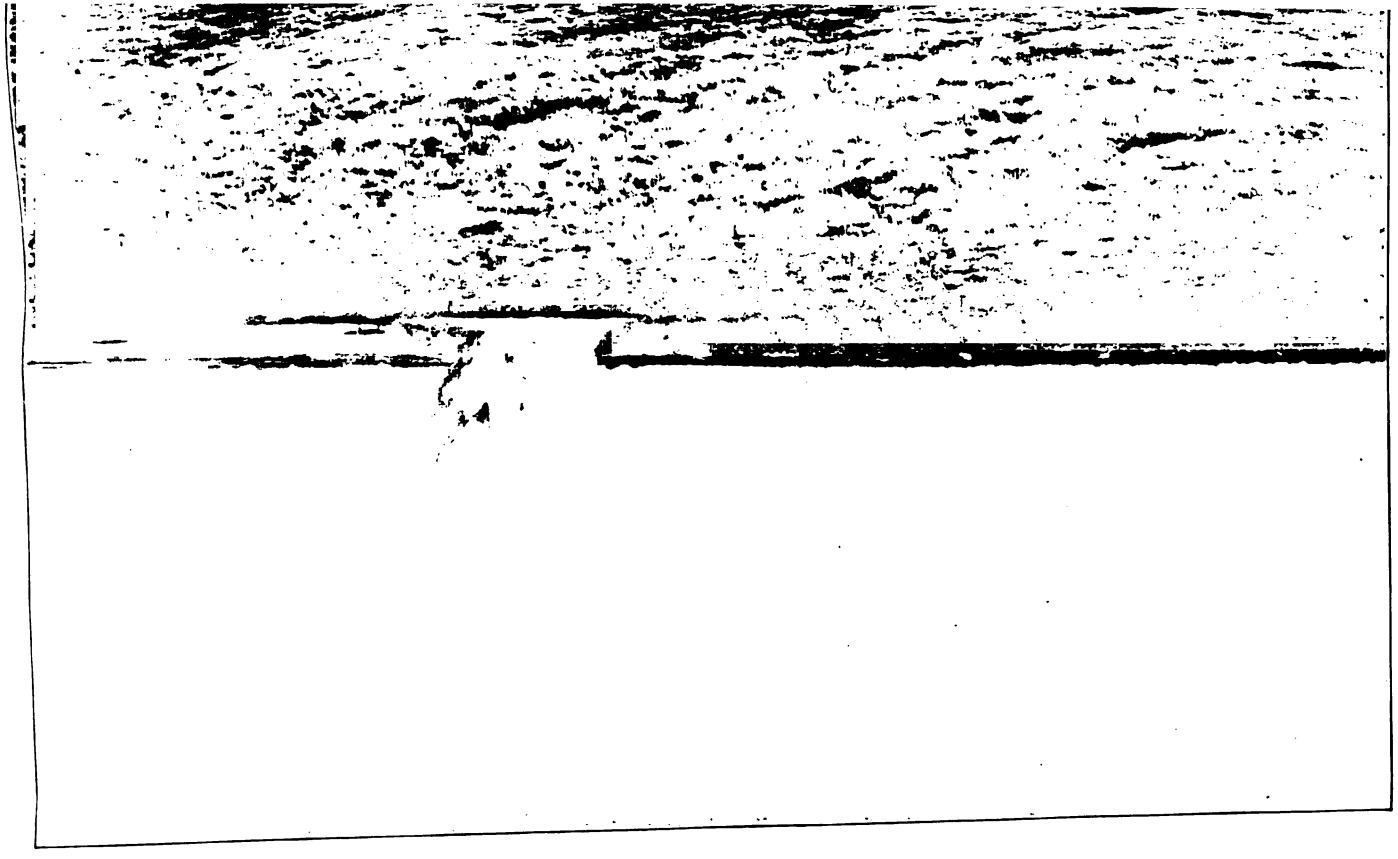
SECOND EXPERIMENT—305 FEET.

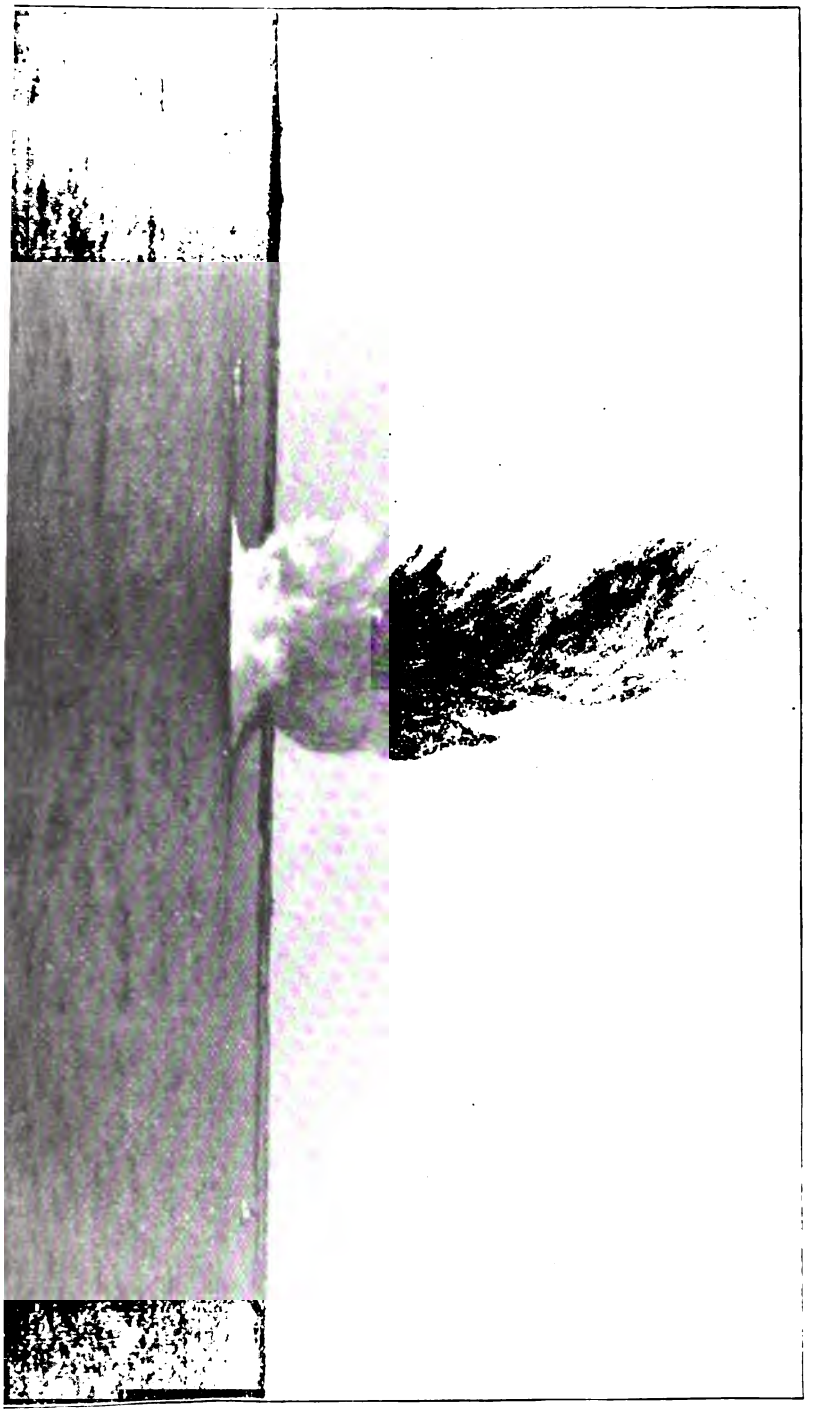


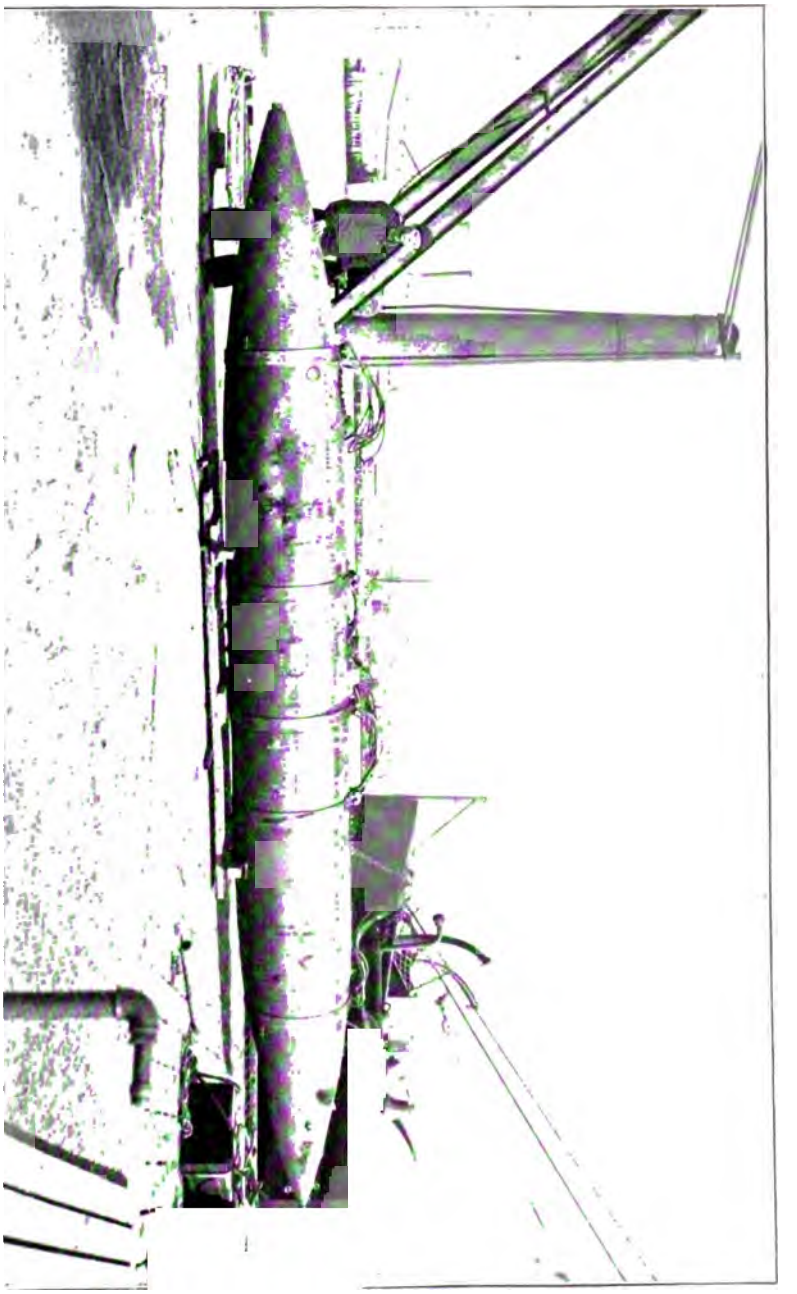
3

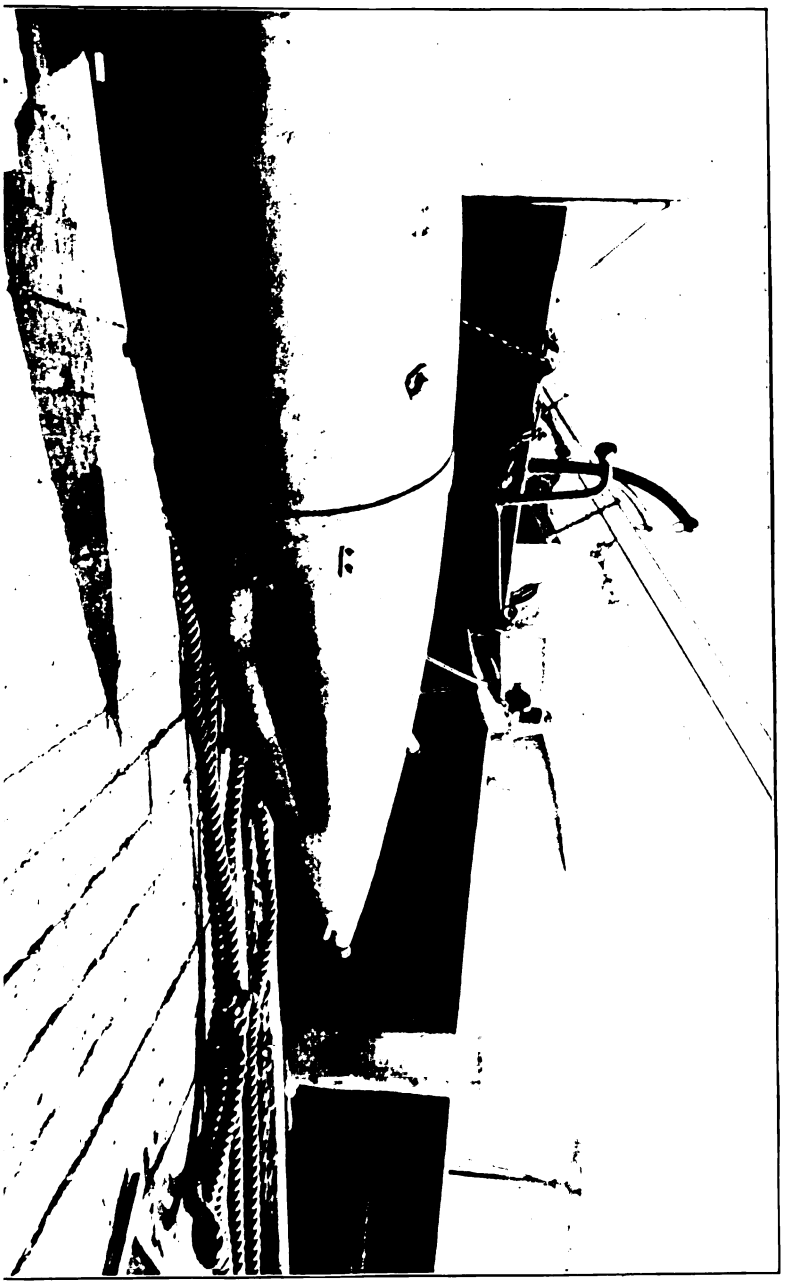
FOURTH EXPERIMENT—150 FEET.

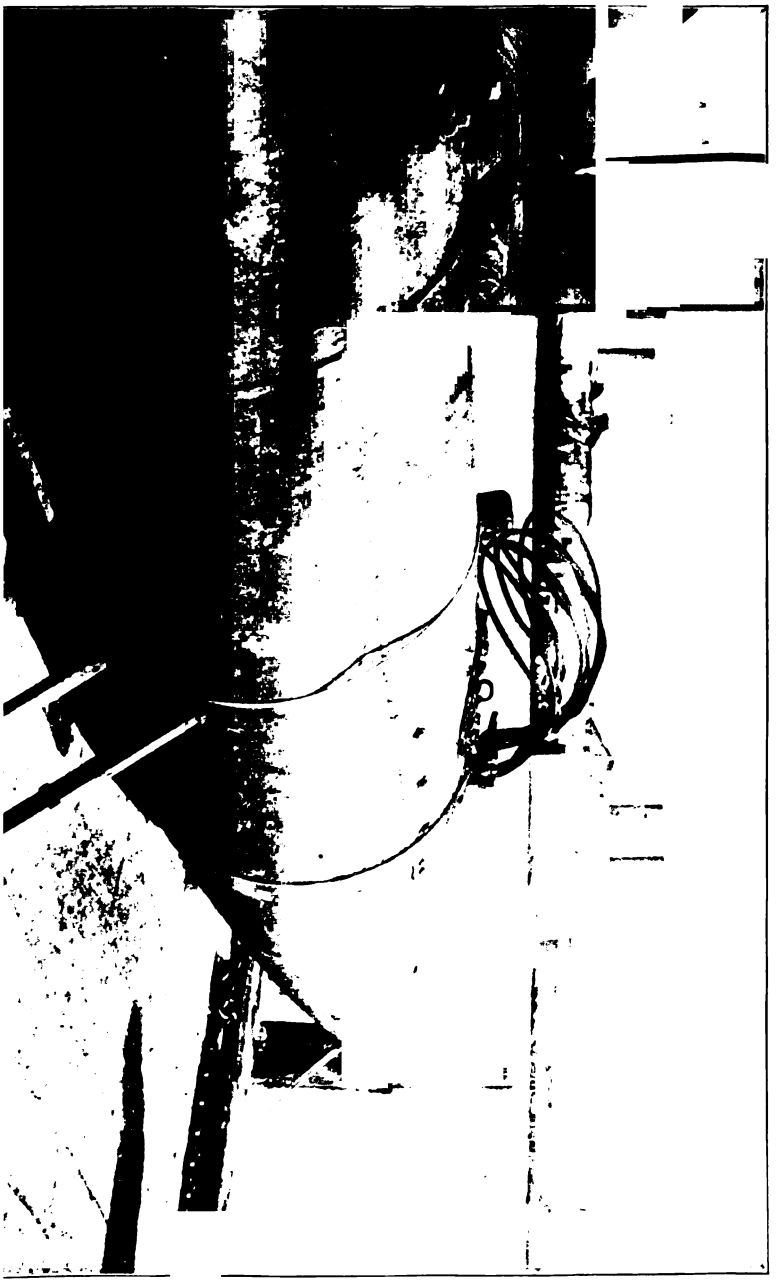


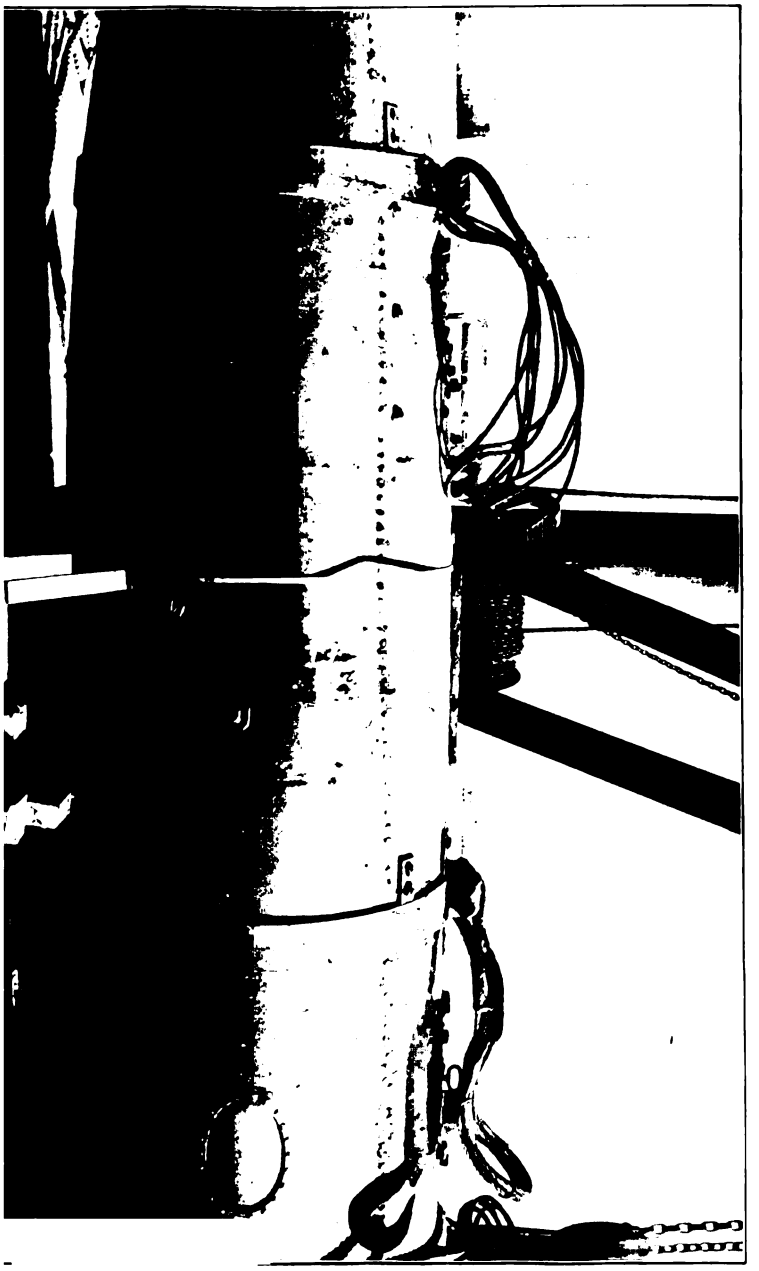












The formula may also be expressed,

$$D = \left(\frac{(6636\ (\theta + 135)\ C)}{P^{1/4}} \right)^{1/2.1} - 0.01$$

In the particular case, $\theta = 90$, $C = 80.7$, $P = 50$, and 81

6636	log 3.82191				
$90 + 135 = 225$	log 2.35218				
80.7	log 1.90687				
	log 8.08096	1/2.1	log 3.84808	1/2.1	log 3.84808
50	log 1.69897	1/1.4	colog 8.78645		
81	log 1.90849			1/1.4	colog 8.63679
$D_1 = 431$			log 2.63453		
$D_2 = 305$					log 2.48487

Whence for $P = 50$, $D = 431$, and for $P = 81$, $D = 305$

Appendix C.

Lieut. Col. Bucknill (Submarine Mines and Torpedoes, 1889, p. 35) gives this equation connecting pressure and distance in submarine explosions, distances measured horizontally.

$$P = \frac{9\ CI}{D} \left(1 + \frac{25}{D^2}\right)$$

where I = relative intensity of explosive, in this case 100, the other letters having the same meaning as in Abbot's formula.

The values of D satisfying this equation for values of P 50 and 81 are 1,453 and 897 respectively, which are therefore the distances required.

C.

REPORT OF EXPERIMENTS WITH CUNNINGHAM ROCKET TORPEDO.

Naval Torpedo Station,
Newport, R. I., November 17, 1893.

Sir: I respectfully submit the following report of experiments with the Cunningham rocket torpedo:

Two of these torpedoes were fired from the Ericsson submarine gun on October 31.

The torpedoes went into the gun readily, having a total clearance of three-fourths of an inch. They were pushed well forward against the bow valve and were held to the front by a wooden boxing, which was used also as a lead for the fuse wires. A special tube with stuffing box had been made to lead the wires through the breech plug.

Both torpedoes were provided with fuses when received. The fuse wires had been left inside the rocket-composition chambers. They had pieces of twine attached with the ends leading through the vent holes as a means of drawing out the wires. Mr. Cunningham, at Lieut. Smith's request, did all the work in connection with the fuses, leading wires, and connections. The latter directed the handling and loading of the torpedoes. Mr. Lassoe, who had previously superintended the work with the gun, had left the station that morning.

On trying to haul out the ends of the wires the twine in the forward vent holes broke in both torpedoes. In the first torpedo a second fuse was entered through an adjoining vent hole.

The fuse used by Mr. Cunningham consisted of two bridges in parallel similar to our vent-sealing primer bridges, with loose wisps of gun cotton wrapped about them and tied on with cotton thread. The whole was covered with white tissue paper

loosely tied on. As there was a fuse in each chamber there were thus four bridges in all, two in series and two in parallel.* For firing he used a machine he brought with him, which he said was capable of firing thirty fuses in series.

When an attempt was made to fire the first torpedo there was no result. On hauling back the torpedo, it was found that the forward fuse had been fired, both bridges being broken and scorched. The after fuse was intact. Two of the torpedo-station igniters were now procured and connected. The forward igniter had to be bent a little at its lower end to permit it to enter the chamber. On the next attempt the torpedo left the gun. The second torpedo was fired in the same way, using the station igniters.

On recovery, both torpedoes showed that the forward charge had not been burned. Counting the two runs here and one failure, and the run last July at New Bedford, all that have been witnessed by the board, there have been four failures of the forward charge to ignite. An inspection of the plan of the torpedo shows that it is beyond reason to expect the forward charge to ignite from a fuse introduced through one of the vent holes, as the fuse would in all probability not be in contact with the charge. An arrangement similar to our gunpowder fuse placed in the chamber before heading up should give satisfactory results, with little fear of failure.

To determine the path of the torpedoes two nets were used, placed, respectively, 200 and 400 feet from the bow of the *Destroyer*. They were made of 9-thread stuff, hung to wooden torpedo booms, and weighted at the bottom with 2-inch pipe. The first torpedo left the gun at an estimated speed of 20 knots and broached the surface at a distance of about 125 feet, jumping the first boom cleanly. It then ran near the surface and appeared to strike the second boom near the right end. The torpedo after recovery showed an indentation in the head, apparently caused by the blow. The net had a hole 6 inches below the boom. The torpedo was recovered at a distance from the bow of the *Destroyer* of 567 feet.

The second torpedo acted very similarly to the first, broaching soon after discharge, jumping the first boom, then running near the surface, and seeming to strike the second boom near its right end, going over it. Upon recovery the head showed an indentation very similar to that of the first. The distance run was 542 feet.

The booms showed no abrasions. This may be from the fact that they were very smooth, were wet, and the blows were glancing. There was one hole in the second net, none in the first.

Mr. Gillingham has recently sent to this station the igniter from the forward chamber of one of the torpedoes. The bridge had been fused, but the igniter had not exploded. The failure seemed to be due to insufficiency of powder in the case. The igniters used on this occasion had been made by seamen for instruction. None others were available, as they were not kept in store. They were tested for continuity before connection. The bridge must have been intact up to the moment of firing, for the igniter that failed was in series with the one that exploded.

Respectfully submitted.

G. A. CONVERSE,
Commander, U. S. Navy,
President of the Torpedo Board.

CHIEF OF BUREAU OF ORDANCE,
Navy Department, Washington, D. C.

No. 3.

REPORT ON THE MANUFACTURE AND INSPECTION OF ORDNANCE MATERIAL.

OFFICE OF INSPECTOR OF ORDNANCE,
Hartford, Conn., September 13, 1894.

SIR: In obedience to the Bureau's orders, I have the honor to submit the following report on the manufacture and inspection of ordnance material within the district under my charge for the year ending June 30, 1894:

The district embraces the following places of manufacture: Pratt & Whitney Company, Hartford, Conn., Hotchkiss rapid-fire guns; Winchester Repeating Arms Company, New Haven, Conn., large-caliber cartridge cases, Hotchkiss, and small-arm ammunition of all kinds; *Union Metallic* Cartridge Company, Bridgeport, Conn., Driggs and

revolver ammunition; American Projectile Company, Lynn, Mass., steel common shell, shrapnel, and armor-piercing shell up to 6-pounders; Colt's Patent Fire Arms Manufacturing Company, Hartford, Conn., revolvers and machine guns; Hotchkiss Ordnance Company, Providence, R. I., Hotchkiss rapid-fire mounts.

This office is also charged with the inspection of arms at Ilion, N. Y., and equipments at Hartford and New York City. Arrangements have also been made to include the inspection of powder tanks at Springfield, Mass.

The following material remained to be delivered on July 1, 1893:

HOTCHKISS RAPID-FIRE GUNS.

Heavy 1-pounders	25

Accessories and spare parts for the above guns.

AMMUNITION.

1-pounder armor-piercing loaded rounds	50
1-pounder common loaded rounds	100
3-pounder armor-piercing loaded rounds	5,000
6-pounder armor-piercing loaded rounds	13,000
1-pounder armor-piercing shell	4,701
6-pounder armor-piercing shell	20,000
3-pounder tubular common shell	100
6-pounder tubular common shell	100
4-inch steel common shell	10,000
5-inch steel common shell	3,000
6-inch steel common shell	1,975
8-inch steel common shell	1,500
10-inch steel common shell	50
12-inch steel common shell	100
5-inch cartridge cases	472
6-inch cartridge cases	3,000
Time fuses	50

HOTCHKISS RAPID-FIRE MOUNTS.

1-pounder hydraulic, with deck circles	29
1-pounder hydraulic top carriages	4

SMALL ARMS AND MISCELLANEOUS.

Lee magazine rifles and equipments	325

One Gatling gun and electric motor.
One set star gauge rings for Drigg's rapid-fire guns.

The following material was ordered during the year:

HOTCHKISS RAPID-FIRE GUNS.

Heavy 1-pounders (with accessories and spare parts)	18
6-pounder (with accessories and spare parts)	10

AMMUNITION.

1-pounder steel shell	14,634
1-pounder steel shell (labor of loading and fusing)	14,665
6-pounder steel shell (labor of loading and fusing)	1,387
47-mm. common shell	200
1-pounder cartridge cases	4,751
3-pounder cartridge cases	50
6-pounder cartridge cases	33,009
47-mm. cartridge cases	5,073
3-inch cartridge cases	3,000

5-inch cartridge cases	5,000
6-inch cartridge cases	3,000
6-mm. cartridge cases	1,000
6-mm. jacketed bullets	1,000
6-mm. cartridges (36 grains)	25,000
6 mm. cartridges (40 grains)	200
6-mm. cartridges (defective primers)	300
6-mm. dummies	100
4-inch shrapnel	1,000
5-inch shrapnel	1,000
6-inch shrapnel	2,000
.45-caliber rifle cartridges	1,500
Fuses (inside base)	9,624
Fuses (outside base)	50,898
47-mm. nose fuses	10,073
1-pounder wads	26,770
3-pounder felt wads	778
6-pounder wads	20,009
47-mm. wads	7,092
6-pounder cork wads	2,000

HOTCHKISS RAPID-FIRE MOUNTS.

1-pounder hydraulic mounts	18
6-pounder hydraulic mounts	10
6-pounder cage stands	10

SMALL ARMS AND MISCELLANEOUS.

.22-caliber Winchester single-shot rifles	6
Winchester single-shot rifles	4
Copper cups	400
Canvas leggings, pairs	25
Hand-crank for Hotchkiss revolving cannon, 37 mm	1
Extractors for revolving cannon	2

Spare parts for Hotchkiss rapid-fire guns.
One set fuse thread gauges.
One 3-inch gun.
One globe and peep sight.

Additions have been made in the way of new tools, fixtures, and gauges, and in a number of cases old ones have been replaced, but the capacities of the plants remain as reported in my last annual report.

The following is a record of the deliveries and work at the various plants:

Pratt & Whitney Company, Hartford, Conn., subcontractors for the Hotchkiss Ordnance Company. Inspected and delivered under orders for the Navy:

1-pounder rapid-fire guns (heavy)	25

The pending order for 1-pounders is nearing completion, the guns having been proof-fired.

The 6-pounders have reached the stage when shrinking-in will shortly begin.

A large order for spare parts was placed and executed during the year, and it is believed that the supply on hand at the navy-yard, New York, will be sufficient to supply quickly and conveniently all the needs of the service for a number of years.

A set of star-gauge rings and a new set of master fuse thread gauges were made, and the latter gauges are now being used in the preparation and comparison of the inspection and working gauges at the various factories.

A lot of 1-pounder and 6-pounder guns is being made in addition to those on naval orders to provide for emergency orders, and these are

also being inspected and will be in all respects ready for immediate delivery.

Under direct orders from the Department there was manufactured and tried a 3-inch field gun with a new type of breech closure. A report on the action was forwarded at the time.

Exhaustive experiments in the manufacture of small caliber small-arm barrels with different kinds of steel were carried on during the year under the direction of the Bureau, and the facility of working steel containing about 4 per cent nickel was fully established.

An order for fifty of these barrels of .236 caliber was placed with the contractors, and about thirty-five have already been supplied to inventors and others for the development of rifles and ammunition.

Winchester Repeating Arms Company, manufactured, inspected, and delivered:

(1) Under direct orders from the Department:

5-inch cartridge cases	3,872
6-inch cartridge cases	7
3-inch cartridge cases	27
1-pounder cartridge cases	50
3-pounder cartridge cases	50
6-pounder cartridge cases	50
.45-caliber cartridges	1,500
.236-caliber cartridges	5,000
.236-caliber cases and bullets	1,000
Copper detonator cups	400
Winchester single-shot rifles and sights	4
Winchester single-shot rifles (.22-caliber)	6

(2) Under subcontract for the Hotchkiss Ordnance Company:

-pounder armor-piercing loaded rounds	9,000
-pounder cartridge cases	25,000
-pounder outside base fuses	21,393
-pounder inside base fuses	2,387
-pounder wads	19,287
-pounder wads	25,202
7-mm. wads	6,727
-pounder armor-piercing shell	1,000

Deliveries on the second order for 5-inch cartridge cases began during he year and the cases were nearly completed. Experiments and tests vith electric primers, however, delayed the deliveries and 1,600 yet emain.

Test lots of primers have gone forward for the firing test, and upon .ceptance of these the remaining cases will be primed and shipped.

The development of the manufacture of electric primers included everal changes of design, and the failures and defects developed under est resulted in the establishing of a system of electrical tests in the ourse of assembling and loading which is believed to insure efficiency s far as can be done without actual firing. To further insure effiiency, an additional number from each lot is tested by firing the averge percentage, being about four.

The manufacture of 6-inch cases was regularly begun, but the firing test developed the necessity of a cup in the mouth of the cases as a means of resistance to the gases to aid in forcing the case against the chamber to check the gas. The cup incidentally acts as an air or water tight covering for the powder, as in this caliber the projectile is not assembled with the case.

The cups are made of brass and are about 0.02 inches thick and 2 inches deep, and are assembled with the case, convex side out.

Samples have been tried at the proving ground, and having been found satisfactory an order for 3,500 was placed and the manufacture regularly begun.

The manufacture of 3-inch cases has not yet regularly begun, as the firing tests have developed failure to check gas satisfactorily at the mouth. It is believed that the shortness of the case so increases its rigidity that the mouth of the case fails to expand quickly enough, and various remedies are being tried. Sample cases with (1) reduced thickness at the mouth, (2) beveled mouths, and (3) clared mouths, will shortly be tried and possibly also a reduction of the chamber diameter.

The tools and gauges for the work on the 3-inch cases are completed and the manufacture can be commenced as soon as a satisfactory type is established.

The development of the manufacture of 0.236-caliber ammunition was carried on during the year, and the difficulties have been almost entirely overcome. Deliveries were made to the torpedo station and the proving ground, and in addition ammunition has been furnished to inventors for their use in developing rifles for the coming tests.

The deliveries of Hotchkiss ammunition have been continuous, and the order for 6-pounder armor-piercing loaded rounds was completed during the year. The shell tested were all accepted in accordance with the specifications requiring a penetration of 4 inches of wrought iron without breaking up or upsetting more than one-fourth of an inch, except in a few cases where the obliquity of the impact or the knowledge that the shell struck the retaining walls of the butt were known to be the cause of breaking. The 1-pounder armor-piercing shell are equally good, and although the requirements were changed by the substitution of a 1-inch steel plate for a 1-inch wrought-iron plate in the penetration test, all the shell passed satisfactorily.

The cartridge cases are now all being solid drawn and are very satisfactory in all their actions. Changes in the minor dimensions were made during the year which, it is believed, will remedy certain defects discovered.

The action of fuses and primers has been highly satisfactory, no failures at all having been observed in any of the tests.

During the year all the various details on hand at the navy-yard were collected and sent to these works, where the shell were loaded and fused and assembled into loaded rounds.

Nearly all the minor caliber rapid-fire ammunition has been completed, and it is expected that all outstanding orders will be finished in about three months.

Union Metallic Cartridge Company, subcontractors for the Driggs Ordnance Company, inspected and delivered:

3-pounder armor-piercing loaded rounds	3,000
47 mm. cartridge cases	5,073
Outside base fuses	3,433
6-pounder cork wads	2,000
6-pounder felt wads	722
3-pounder felt wads	778
1-pounder felt wads	568
47 mm. felt wads	1,365

The shell for this ammunition are supplied from the Cramp's works, and the supply of cases and fuses has kept well ahead.

The 3-pounder cases have all been inspected and tested, and 2,000 remain to be delivered upon the arrival of the shell for assembling.

der for 1-pounder armor-piercing loaded rounds has been com-
nd the ammunition awaits the arrival of a tug for delivery.
' mm. cartridge cases were inspected up to the point of firing,
ɔ gun was available, the cases were proof fired at the proving

ɔt of 250 armor-piercing shell from the American Projectile
y, for which cases and fuses are being made, has been received
mbled, and is ready for delivery.
anufacture and test of fuse springs has now been established,
ıction of all the details of the ammunition is very satisfactory.
can Projectile Company inspected and delivered:

armor-piercing shell	250
steel common shell	100
steel common shell	100
ɪl common shell	7,768
ɪl common shell	2,500
ɪl common shell	1,000

ɔmpany has been engaged largely in the experimental work of
ng new processes during the year, as, owing to the failure to
r deliver satisfactory tubing, dealings with the tube supplying
' had to be discontinued.
eliveries on contracts for shell on present orders are, however,
ıg, and it is believed they will be completed in the time granted
xtension, namely, February 8, 1895.
ts of 6-inch shell have so far been accepted, and the manu-
ɔf 8-inch shell will be commenced as soon as the new process
fully established on smaller calibers.
ries of experimental shrapnel have been made and the proof
ɔr the first regular lot have been shipped. The manufacture
is now well established, and their action in firing tests has
y satisfactory.
iments have been made with a point time fuse, and the prin-
iculty, that of obtaining uniformity in the time train, has been
e by a method of rolling the train. Work has been begun on
experimental fuses ordered, and upon the successful action of
ls will be made for fuses for all shrapnel ordered.
rst two lots of armor-piercing projectiles were tested and
, and the third lot is well under way. The difficulties at first
ced with imperfections at the weld are believed to be overcome,
ıal inspection, combined with tapping by a hammer, has
in a uniform product.
xperimental 3 and 6 pounder common shell were completed
he year, but experiments with the application of the Harvey
ɔf hardening were not deemed successful, and no more of this
'e ordered.
Patent Fire Arms Company.
were only a few deliveries of revolvers by this company during
, and these were for the naval militia from completed lots.
ɔection was therefore limited to the "stand" inspection.
ɪperimental Gatling gun was completed during the year, and
ɪ of fitting the motor is now going on. An official trial of the
ɔr was made and reported on. No official trials of the new
ıs yet been made, but with the exception of certain minor
ın the clutch coupling, found necessary from private tests, the
ıd gun are expected to be shortly ready for regular test.

Hotchkiss Ordnance Company, Providence, R. I. Inspected and delivered:

1-pounder rapid-fire mounts	32
1-pounder hydraulic top carriages	1
6-pounder cage stands	10

The work at this plant has been principally on 1-pounder mounts, both for naval and landing outfits.

One order for twenty-five 1-pounder mounts was completed and another for eighteen top carriages nearly completed. These mounts are inspected in detail at the works and proof-fired in connection with the guns at Hartford, and in all cases have acted satisfactorily.

The tools and gauges for the 6-pounder mounts have been nearly completed and compared, and the work on the main parts is well under way.

A number of field outfits and other mounts were delivered to the naval militia of various States, and the new type of carriage, which is considerably lighter than last year's model, was tried under approximately service conditions with satisfactory results. Various improvements have been added, notably a gun rest and a breech cover for use on the march.

Ten 6-pounder cage stands were ordered during the year, but the labor only was contracted for, the castings being replaced by the Bureau. These, like all other material made for stock by this company, were made in accordance with standard Navy drawings and inspected ready for delivery when called for.

GENERAL.

A number of rapid-fire guns, mounts, rifles, and equipments were made and inspected during the year for delivery to the naval militia These were, in some instances, ordered direct by the militia organizations, but the material was inspected as in all respects up to the naval standard.

A contract is now pending for large powder tanks, and the preliminary designs, based upon the Bureau's requirements, have been forwarded for approval.

Considerable material was ordered during the year direct by naval stations, but in all cases where material required inspection in the course of manufacture or where special facilities for accurate and quick inspection obtained at the works the inspection was made by this office.

The following is a résumé of the work and experiments on the various ordnance material during the year coming under the notice of this office:

RAPID-FIRE GUNS.

Improvements in the Hotchkiss guns have extended to the guns, mechanism, and sights. The twist of the 6-pounder rifling has been increased to one turn in 25 calibers, and the occasional oblique impact of projectiles, it is expected, will no longer take place. The outside form has also slightly been altered, the tube now being tapered only to within about 13 inches on the muzzle and being cylindrical thence forward.

The 1-pounder breech has been slightly lengthened to permit the direct insertion of sight bar in the gun.

The mechanism in both calibers is now of the new type, and all guns of the new design are now designated Mark II.

In the transition from the flat to the spiral mainspring the complication of conditions rendered calculation of the required tension impracticable, and the practical method of measuring the blow of the firing pin by the depth of the impression in Babbitt metal was used to determine this tension. As the sensitiveness of primers was originally established by the use of the Hotchkiss guns, this will insure equal certainty of freedom from missfires as has been heretofore obtained.

Recent competitive tests at Sandy Hook, from their severity, developed certain features which permitted improvement, but which have heretofore not been considered so essential in naval guns, notably the tendency to withstand dust and rust tests. In the dust test, such as was given, as might have been anticipated, the Hotchkiss gun failed, the openings in the block and housing for crank clearances becoming very much choked. An improvement to correct this is now under consideration. The rust test developed the fact that parts that were "browned" were almost entirely unrusted, and the Pratt & Whitney Company have declared their intention of browning, at their own expense, the interior of breech housings on all outstanding and future orders of guns.

A gratifying feature in regard to the strength of Hotchkiss naval guns was developed during these trials, a chamber pressure of about 65,000 pounds per square inch having been obtained in the course of the excessive charge tests without any apparent injury to the gun.

The sights, both front and rear, have been entirely changed. The cone front sight has been abolished, and a form of flat flaring sight adopted, by which a minimum obstruction of view is obtained, together with a well-defined sighting point.

The rear sight box has been abolished, and the bar is now inserted in the body of the breech. The rack and pinion are not used, the bar being held by a clamp screw on the rear face and being moved vertically by direct lifting. To obtain the desired maximum elevation with this design, and to avoid protrusion below the breech, the sight bar in the 1-pounder gun is made in two telescopic sections for use at the higher angles.

The notch in the rear sight has been modified and the movable leaf abolished, and the whole sighting arrangement of the guns is now very much simplified and more rapid adjustment facilitated.

No automatic attachment to rapid-fire guns to prevent the opening of the breech before the explosion of the cartridge in the case of hangfires has yet been tried, but it is believed the permanent introduction of smokeless powder will make such a feature necessary in the case of rapid firing.

MACHINE GUNS.

Experiments in this line have been more in the direction of adaptation of known designs to fire the smokeless powder ammunition than in new designs, the success of which was shown in trials of guns before the Naval Machine Gun Board.

The work of fitting a motor to the Gatling gun has been carried on during the year and a fairly successful trial was reported on. The crude model having been developed, the contractors are now at work on a new one of the same design to be fitted to the new model gun. As all former experiments were made with black powder cartridges, the results will be looked for with interest.

It has been demonstrated that although there is a probability of damage due to hang fires in nonautomatic guns the gravity of the damage

has been overestimated. This is no doubt due to the large percentage of unburned powder blown away owing to lack of confinement when the cartridge is withdrawn from the chamber.

But the advantages of automatic guns, not only in this, but in many other respects, over hand-operated guns are still very great.

The recent trials also developed the importance of proper "breeching up" of the gun in preventing rupture of ammunition, and the difficulty of maintaining this feature in service is an argument in favor of the value of introducing nickel-steel as the material for cartridge cases.

SMALL ARMS.

Experiments and work in this district have been confined exclusively to the development of the barrel and ammunition of the caliber adopted by the Navy, namely, 0.236 inch. Seven kinds of steel were tried with a view to determining the commercial machine qualities, and in all operations the steel containing 4½ per cent nickel showed itself superior. A number of barrels were made and fitted to experimental breech mechanisms. These were exhaustively tried at the torpedo station and at the naval proving ground, and the good qualities of the nickel-steel were further verified.

The principal element of difficulty would appear to be the wearing of the interior of the barrel, but the life of a barrel has not yet been ascertained. Experiments will shortly be made in methods of hardening, which, it is expected, will obviate this.

The ballistic advantages claimed for the small caliber adopted have been borne out at the tests, and the velocity, accuracy, and penetration have approached very closely those predicted by the board.

Experiments abroad with smaller calibers have apparently demonstrated that the limit of efficiency can not be materially extended by a much further reduction, and the question of shock is about the only one on which a doubt now rests in the superiority of the smaller caliber.

The form of rifling so far used has been a compromise, and for manufacturing reasons it is believed the Metford form can be adopted without impairing the ballistic efficiency.

No practicable new types of mechanism have come to the notice of this office except the Lee straight-pull system, a report on the action and trial of which was made at the time.

The importance of sights to be adopted for the new small arm has been fully demonstrated, and can not be overestimated. The character of the sights is of course largely governed by the nature of the service required, and several forms have recently been submitted for trial which correct many of the objectionable features obtaining in sights now in use.

AMMUNITION.

In the matter of minor calibers of rapid-fire ammunition the new features have been mainly in the nature of improvements on former designs. The base fuse threads in shell have heretofore been right-handed, and although no positive proof has occurred of the probability of the fuse working out under rotation, the thread has been changed to a left-hand one, and the outside base fuse adopted for both armor-piercing and common shell. The recommendation made last year that no change in the specifications for penetration requirements, with a view to decreasing the severity, was desirable, has been demonstrated by the quality of the shell so far delivered; and, as has been stated,

the requirement was even increased in the case of the 1-pounder steel shell.

The cartridge cases are now being solid drawn, and improvements in these have been limited to the quality and minor dimensions. Especial attention was paid to the tension in the cases at the mouth in gripping the projectile, the aim being to obtain a minimum strain on the case consistent with rigidity and stability of the round. That this was necessary was demonstrated by the discovery of 3-pounder rounds in service with the cases split at the neck, which is ascribed to the excess of tension. This has been now remedied and additional measures have been taken to obtain uniformity in the manufacture by the different contractors. To this end the Bureau has issued common designs for cartridge cases and projectiles, and the dimensions of these and the general dimensions and requirements of all details of ammunition have been so arranged as to insure serviceability and interchangeability.

Certain difficulties in using ammunition have brought out the necessity of care in reloading and recommendations to this end affecting the service reloading tools were recently made.

Experiments in the larger caliber class of rapid-fire ammunition were made with cartridge cases, electric primers, and projectiles.

The action of cartridge cases where the projectile is inserted in the case as fixed ammunition has been very satisfactory, but as has been stated in the case of 6-inch cases a mouth cup was found necessary. The objection to this was that in the case of using the case after firing, without reforming, the change in dimension would require in each case a different size cup. This is expected to be overcome by making the cups all of the same size (that of new cases) and by the use of a tool similar in nature to a boiler tube expander, by which the cup can be expanded to fit the case.

The manufacture of electric primers is now on a commercial basis, and the electric shop inspections are believed to insure almost perfect primers.

These inspections are made with a galvanometer and a battery of dry cells of sufficient power to make the bridge glow and were made at four stages of assembling: (1) After insertion on central contact post, for insulation; (2) after insertion of bridge and contact rings, for continuity of circuit; (3) after wrapping gun cotton around bridge, for contact—this test is with a small percentage selected at random, and the bridges are then rearmed; (4) after final loading and assembling.

Since the regular manufacture was begun over 4,000 primers have been delivered, and of the test lots of these but two failures to ignite on contact and one failure to check gas were observed. Of those failing to fire one was returned as it came from the proving ground, and after examination and repriming worked perfectly.

The efforts of the contractors making larger caliber projectiles have been confined to improvements in processes, but the regular manufacture of satisfactory shrapnel was successfully established.

Electric welding still forms the fundamental feature of these projectiles, but the improvements in the art, together with the change of location of the weld line, have practically resulted in new designs.

Experiments in determining the time of burning, at rest, of the time train of the time fuses for these sharpnel were made, and from comparisons with the burning in flight, a curve has been constructed from which the fuses may be directly graduated.

Extensive experiments both in the development and manufacture of small caliber *small arm ammunition* were made during the year both by

the manufacturers and the Bureau. The tendency of the fired case to stick, together with the difficulty of obtaining a perfectly gas-tight primer, has been almost entirely overcome, but the occasional bang fires and rupture of a case still occur, and the manufacturers themselves consider the ammunition not yet perfect.

Experiments have been made with partial success in the manufacture of cases from steel containing about 27 per cent nickel, and it is believed that eventually this material, or steel with a less proportion of nickel, may prove commercially successful.

Incidentally the most favorable size of firing pin and hole for the 0.236 cartridge was determined and the dimensions furnished by the Bureau to inventors and others interested.

Comparative tests were also made with smokeless powder ammunition loaded by weight and by measure, and, as anticipated with the present form of powder grain, that loaded by weight was more uniform and up to the required velocity.

This has resulted in weighing all the charges, and unless other forms of grain are introduced, which will make loading by measure practicable, automatic weighing machines will have to be introduced.

MISCELLANEOUS.

An estimate covering the expense of altering the present Navy revolver to correct the objectionable features mentioned in my last report was made by the Colt's Company and forwarded to the Bureau. The company is now embodying these alterations in new revolvers, and those furnished during the year were of the new pattern.

Several designs of magazine pistols were examined and on one a report was made to the Bureau by me. The most of those examined were of the "blow-open" design, and, although they acted well, possessed features which made them unserviceable. They were all made for use with smokeless powder, and the magazines and charges were similar to those of rifles.

The field outfits so far delivered to the naval militia are quite complete and are now as light as is consistent with the service required. But in the event of adoption as a service outfit various modifications are deemed desirable, notably facility for all-around train of the gun over the wheels, and the introduction of hub brakes and a seat. The first two will be found very important in street use where the streets are narrow, and where the shoe in trail can not take hold.

The supply of a neat, serviceable breech cover is considered a necessary and valuable feature.

Very respectfully,

A. C. DIEFFENBACH,
Ensign, U. S. Navy, Inspector of Ordnance.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

No. 4.

REPORT ON THE WORK AT THE NAVAL PROVING GROUND.

NAVAL PROVING GROUND,
Indian Head, Md., September 8, 1894.

SIR: I have to submit the following report regarding this station and the work completed and in progress during the past year.

PROGRESS OF STATION.

Since making my last report the brick retaining wall in rear of velocity battery has been completed and extended as far as the secondary-battery platform, and the bank has been so sloped and graded that there is no more sliding or caving on firing the heavy guns.

A suitable covering shed with folding side doors has been erected over the secondary-battery platform, so that the guns are no longer exposed to the weather.

A pit has been made and the 13-inch gun mount installed on the velocity-battery platform, and has stood the proof firing of one gun and several samples of powder without any change, holding the mount in position without moving.

A suitable derrick has been erected for handling 13-inch shell in rear of the gun.

The test of heavy plates requiring attack from the 13-inch gun rendered a target structure necessary in front of the velocity battery, and a very substantial one has been built in the place formerly occupied by the old steel target structure which was destroyed. This structure is of sufficient dimensions to hold two small plates or one large one, and is also fitted with a pit lined with 1½-inch plates, so that any of the oak uprights can be replaced when injured by projectiles without disturbing the others. It has already been used for the tests of two 17-inch and two 18-inch Harveyized nickel-steel plates, and the uprights shot away during the tests have been very economically replaced.

The light railroad track, mentioned in last report, connecting range battery and the butts on the opposite side of the valley with the main tracks, has been completed, and has already proved itself of great service. The main railroad track has been straightened, so that wide cars can now be taken direct to storehouse.

The three target structures for light plates up to 10-inch thickness, eastward of the range battery, have been put in thorough repair. Their butts were made of sand instead of earth, which has much decreased the cost of digging out.

A small-arm rifle range has been established on the Irwin farm, 1,000 yards in length, and has already been used in the comparative test of machine guns by the Machine-Gun Board, and also a test of small arms.

A small secondary-battery platform of sufficient size to contain a 1, 3, or 6 pounder has been built, so as to fire down the range and observe velocity at the same time. This was rendered necessary so that returned fixed ammunition could be retested for velocity, etc., under service conditions, with the loaded projectiles, just as returned from the ships.

Early in the year a bucket-and-ladder fire department was organized; at least one ladder and a supply of wood-pulp fire buckets being placed at hand at each and every building on the reservation. These, together with fire extinguishers at all the important places, and water barrels where wells or cisterns are not at hand, give some protection

from fire, but not all that the value of the property requires. Fortunately the trees, undergrowth, and grass were cleaned away from around the magazines in the spring, so that with the prompt and willing assistance of the employés living on the reservation, as a bucket brigade, a conflagration was averted when the high-explosive magazine burned up on July 1, 1894. Report concerning this fire and report of board of investigation are appended to this report, marked A, B, C.

A temporary high-explosive magazine has been built out of remnants, old doors, etc., which came from the old ship house at the Washington navy-yard. This will be replaced by a suitable brick structure at the first opportunity.

The large boiler at the machine shop has now been covered over with a shed roof and protected from the landslide from the adjacent hill by a retaining wall. This landslide caused a great deal of trouble, at one time endangering the boiler. The earth which came down was used in widening the road near at hand and in filling in a low spot near the storehouse. Finally the landslide was stopped during a dry spell with a retaining wall, and since then there has been no trouble from it. This shed covering the boiler has been made sufficiently large to cover the coal supply of the station and at the same time have it near the boilers ready for use.

Cottage No. 2, occupied by the gunner, has been repaired, enlarged, and put in good condition, and the well deepened, but the water supply is still insufficient, and water has to be hauled in barrels.

A suitable wagon shed for covering and protecting the wagons, carts, farm utensils, etc., from the weather has been erected near the stables out of refuse materials.

The house on the Irwin farm has been thoroughly overhauled and repaired and changed into a double house, so that two of the employés of the station are now comfortably housed with their families.

A retaining wall behind the range battery, to contain a bombproof, has been nearly completed.

The wharf has been widened on the upstream side, and extended 6 feet farther out into the river, and a number of new piles have been driven in the wings of the barge slip to stiffen them. Four piles have been driven about 100 yards down the range, on which will be placed a permanent screen for the test of shrapnel and fuses.

The largest firing butt, the top or roof of which was badly damaged by 12 and 13 inch projectiles glancing upward, has been put in thorough repair again, several of the roof plates having been replaced. As soon as a proper drain is constructed under the bottom of this butt it will be in excellent condition.

A complete wire fence now incloses all the Government reservation, except a portion on the southern boundary. This will be put up as soon as the boundary line is surveyed, the material being already on hand. One-half of the northern boundary fence, from the main road to Mattawoman Creek, was put up by Mr. Cox, the owner of the adjacent property.

The roads have been repaired where necessary. A corduroy road covered with gravel, running through the middle of the whole length of the valley, has been constructed. It is now possible to haul from the wharf with teams at all times when necessary, without getting mired in the mud.

Work on the North or Irwin farm has been continued. Enough provender for all the stock during the winter has been, or will be, harvested; although this year the crops have not been at all successful on account of the drought.

The sewerage from Cottage No. 1 and the office has been led 600 feet farther down the ravine, below the latter building, by means of a 6-inch terra cotta pipe drain.

The telephone line has been constantly in use during the past year, except for two or three interruptions of several days each. It has been struck by lightning on several occasions, and once the office was set on fire and the telephone instruments burned out. The half of the line nearest Indian Head has since been provided with a lightning arrester and conductor each half mile, and the whole line has been guyed, repaired, and straightened. A number of poles shattered by lightning have been replaced.

The chronograph wires running across the east end of the valley, which were underground, have been replaced on overhead frames, giving better satisfaction, although the wires are sometimes cut by pieces of projectiles and plates.

The installation of a complete brickyard plant has been completed, and kilns of 65,000 and of 200,000 brick have been burned successfully, the last kiln costing, approximately, $5.25 per thousand when burned.

A contract for cutting, splitting, and piling 1,150 cords of pine wood on the reservation has just been awarded, and the gun factory and this station will soon be supplied with good pine wood at a cost of about $1.25 per cord.

STATION MACHINERY, FACILITIES, ETC.

Two steam capstans have been installed on opposite sides of the valley, with steam pipes led to them in underground boxes. These two capstans have already proved themselves of great use in unloading and loading the barge, and in moving the traveling crane and cars and other heavy weights about the valley.

The traveling crane has given a great deal of trouble on account of the trucks wearing out and breaking while handling heavy weights. A complete new set of trucks for the lower part of the crane has just been put on, and bids fair to give satisfaction and not wear out. They are made of manganese steel, furnished by the Taylor Iron and Steel Company.

A sand scow has been built, and sand and gravel are now furnished the gun factory when wanted.

Three small railroad hand cars have been built, and are used for transporting powder, projectiles, etc., from the filling house and shell house to gun platforms, and for other light work.

The hydraulic accumulator has been completed, tested, and is now used on the hydraulic system.

The turntables are constantly out of order, and require overhauling and cleaning out after every rain storm, as it is almost impossible to drain them properly. The cast-iron roller paths break frequently, when handling the heavier guns and plates. These turntables should be replaced by two of a modern design as soon as practicable.

The derrick on the wharf is still unsafe for more than a 4-inch gun, but another one capable of handling at least 10 tons is soon to be set up on the north corner of the new wharf.

The launch *Saint Barbara* has been put in good condition again, extensive repairs having been made to the Roberts boiler. The water tubes and upflow coils in this boiler burn out rapidly and often require replacing.

The launch *Ordnance* is in only fair condition, but will still answer the purpose for carrying the mail and general work of the station, such as carrying out targets, sending officers to range stations, etc.

The whale boat is in good condition, but the cutter is old, worthless, will not float, and is not worth repairing.

The machine shop has been completed, the engine and shafting put in place, and some lathes, planers, and shapers not needed at the gun factory have been installed, and now any slight repairs or light machine work can be done without losing the necessary time to send up to the gun factory.

STATION NEEDS.

I have again to call attention to the station water supply, which is not sufficient, especially during the dry season. At present nearly all the wells on the station are dry, or nearly so, and will remain so until the fall rains begin.

The sewerage and drainage system is very defective. The main sewer, through which a small creek flows, consisting only of short pine piles driven on each side, is covered over by pine corduroy, which is itself covered with dirt. This is fast rotting away, and will soon be of no use whatever as a sewer. There is no system of drainage from any of the buildings into this sewer.

The magazines and filling house are all of wood, and will not last long, and also are not of sufficient capacity. They should be built of brick and so designed as to be fireproof, properly ventilated, and of a proper size. They should be placed at the head of the valley, where they would be protected as much as possible from pieces of flying projectiles and plate. The railroad track should be extended so as to reach these new buildings

An appropriation of $20,000 would be necessary to construct these buildings, lengthen the railroad, provide for the sewerage and drainage, and furnish a water supply for the station.

It would also be in the interests of economy to light the station by electricity and heat it by steam, and the necessary plant could be installed with the force now at the station without calling in outside skilled labor.

Attention is again called to the necessity of erecting cheap dwellings for the leading men and boats' crews. It is impossible to keep skilled white labor at this station unless they have some place to live with their families, and there is no suitable place for such people within 10 or 12 miles. These houses can be built of brick made at the station, and would not cost more than $600 apiece. I have to recommend that an appropriation for at least six be asked for.

ARMOR TESTS.

The following armor plates have been tested:

The *Indiana's* second curved nickel-steel barbette plate, 17 inches thick, representing Group 11, Bethlehem Iron Company, was tested for acceptance September 29, 1893. Two Carpenter 12-inch armor-piercing projectiles were used with striking velocities of 1,322 and 1,495 foot seconds. Penetrations of 15.5 and 18.5 inches were obtained, projectiles rebounding entire and uncracked. Plate was uncracked and passed the accepted test. This plate was afterwards demolished in the test of four 12-inch armor-piercing projectiles.

Maine's Harveyized nickel-steel side-armor plate, 12 inches thick, ›nting Group 12, Bethlehem Iron Company, was tested for ›nce October 14, 1893. One Holtzer 8-inch armor-piercing pro- with striking velocity of 1,678 foot seconds, and one Carpenter armor-piercing projectile, with striking velocity of 2,004 foot s, were fired at plate and both broke up without cracking plate. passed the acceptance test. This plate was afterwards demol- ›y the following experimental test of a Wheeler-Sterling blunt- l 8-inch armor-piercing projectile, angular impacts of 8 and 10 rmor-piercing projectiles, and direct impact of 10-inch armor- g shell.

ıdnock's curved nickel-steel barbette plate, No. A-729, 11½ inches representing Group 12, Carnegie Steel Company, was tested ·y 9, 1894. Two 8-inch Holtzer armor-piercing shells were fired ;e, with striking velocities of 1,631 foot seconds (first premium) 534 foot seconds, respectively. Both projectiles penetrated plate. st broke up; the second badly set up. Plate was badly cracked, pper left-hand corner gone, and was rejected.

cond *Monadnock's* curved nickel-steel barbette plate, No. A-667, ›hes thick, representing group 12, Carnegie Steel Company, was February 10, 1894. Two Carpenter 8-inch armor-piercing pro- › were fired, with striking velocities of 1,534 and 1,786 foot sec- The first projectile penetrated 12.3 inches and broke up. Sec- ›jectile penetrated plate and 24-inch backing, and stuck with 0.4 inches in from face of plate; plate uncracked, and passed the ance test. This plate was afterwards demolished in the test of Wheeler-Sterling 10-inch armor-piercing projectiles.

Monadnock's curved Harveyized nickel-steel barbette plate, A-874, ıes thick, representing group 13, Carnegie Steel Company, was April 3, 1894. Two Carpenter 6-inch armor-piercing projectiles fired, with striking velocities of 1,472 and 1,659 foot seconds, ›tively. Both shells smashed on plate, with ogives welded into Estimated penetration, 2 and 3½ inches. Plate uncracked, and accepted. This plate was afterwards attacked by several 6-inch ›ne 8-inch armor-piercing projectiles, with varying velocities, ng them all except the last 6-inch Carpenter special armor-pierc- ›ell, which, with a striking velocity 2,110 foot seconds, penetrated and lodged in backing, but with no cracks in plate. The 8-inch nter armor-piercing shell, with a striking velocity of 1,472 foot ls, got point and ogive nearly through back bulge and broke up. ›acking was then removed and the plate attacked by 6-inch -piercing projectiles without any support except at the ends. A Carpenter projectile, with 2,000 foot seconds striking velocity, ot point through, but broke up.

rooklyn's Harveyized nickel-steel side-armor plate, A-935, 3 inches representing group 14, Carnegie Steel Company, was tested 10, 1894. Three 4-inch Carpenter armor-piercing shells were with striking velocities of 1,206, 1,357, and 1,800 foot seconds, ›tively. The first two broke up without damaging plate. Point of ıird projectile penetrated plate and broke up, punching out back to a diameter of 15 inches, with ogive welded into the fragment. ;roup was accepted.

Indiana's Harveyized nickel-steel side-armor plate, 5107-B1, 18 thick, representing group 14, Bethlehem Iron Company, was May 19, 1894. Two 12-inch Carpenter armor-piercing projectiles red, with striking velocities of 1,465 and 1,926 foot seconds, respec-

tively. First shell penetrated just through, set up and distorted; plate cracked. Second projectile, just through. Plate wrecked and rejected. The Harveyizing of this plate was tested May 29, 1894, by firing a 6-inch Carpenter armor-piercing shell, with striking velocity of 2,000 foot seconds. Projectile behaved normally, breaking up, and ogive welding into plate. Estimated penetration, from 3 to 4 inches.

A *Massachusetts'* curved Harveyized nickel-steel barbette plate, 5533-B1, 17 inches thick, representing group 12, Bethlehem Iron Company, was tested June 12, 1894. Two Carpenter 12-inch armor piercing projectiles, with striking velocities of 1,410 and 1,858 foot seconds, respectively, were fired. Both projectiles broke up. Estimated penetrations, 6.3 and 15 inches. Plate passed the acceptance test.

The *Oregon's* curved Harveyized nickel-steel plate, B-107, 17 inches thick, representing group 15, Carnegie Steel Company, was tested July 12, 13, and 23, 1894. One Carpenter 12-inch armor-piercing projectile was fired, with striking velocity of 1,410 foot seconds; penetrated 13.6 inches, and rebounded to the front; set up, but uncracked. Wheeler-Sterling 12-inch armor-piercing projectile was fired, with striking velocity of 1,858 foot seconds, in center of plate; penetrated plate, backing, and 18 feet into the butt. Projectile recovered entire. Carpenter 12-inch armor-piercing projectile was fired, with striking velocity of 1,858 foot seconds. Projectile welded into plate, base sticking out 10 inches from face of plate. Another Carpenter 12-inch armor-piercing projectile was fired, with same striking velocity of 1,858 foot seconds, and penetrated 19 inches. Projectile broke up. This plate passed the acceptance test.

A second *Indiana's* Harveyized nickel-steel side-armor plate, 5049-B1, representing group 14, Bethlehem Iron Company, was tested July 19, 1894. Two Carpenter 12-inch armor-piercing projectiles were fired, with striking velocities of 1,465 and 1,926 foot seconds, respectively. Both projectiles broke up. Estimated penetrations, 11 and 17 inches. Plate passed the acceptance test. This plate has since been used in testing one Wheeler-Sterling 12-inch armor-piercing projectile, which was fired with a striking velocity of 1,926 foot seconds, and broke up, with estimated penetration of 15 inches.

The following additional plates have been fired at experimentally and in the test of projectiles, etc.:

A half-inch steel-riveted cylinder, 48 inches long and 48 inches in diameter, was tested, using 5-inch common shells at low and high velocities, to show the character of the holes and bulges on both sides of the cylinder.

The experiment with angular impacts, mentioned in last year's report, was continued by firing 8 and 10 inch armor-piercing projectiles against *Maine's* 12-inch Harveyized nickel-steel side-armor plate at angles of 30° and 35° with service striking velocities. Projectiles failed to "bite," but glanced and gouged out a portion of plate, breaking up.

The *Oregon's* 8-inch curved nickel steel plate, 8 inches thick, was demolished in test of 8-inch Wheeler-Sterling armor-piercing shell.

The *Amphitrite's* 9-inch nickel steel plate was finally destroyed in the test of Wheeler-Sterling 5 and 8 inch projectiles.

A 12-inch common steel plate was wrecked in the test of two 12-inch and two 10-inch armor-piercing projectiles.

A special ballistic test was made of *Oregon's* nickel-steel sponson plate A-660, 4 inches thick, Carnegie Steel Company, using two 4-inch Carpenter armor-piercing projectiles, with striking velocities of 1,421

nd 1,561 foot seconds. First penetration, 5.5 inches; shell rebounded. econd penetrated through, projectile lodging in first tier of backing. This sponson was afterwards attacked by three 8-inch common shells, vith striking velocity of 1,000 foot seconds. One broke up against plate and two penetrated.

A special ballistic test of *Terror's* nickel-steel side-armor plate A–489, l inches thick, belonging to group 10, Carnegie Steel Company, was nade December 26, 1893, using one 6-inch Carpenter and two 6-inch Holtzer armor-piercing projectiles, all of which were delivered with striking velocities of 1,673 feet-seconds. The first projectile struck at an angle of 14.5°; penetrated about 5 inches of the backing, breaking in two, point remaining in. The second, delivered with an angle of fire of 12°, penetrated through plate, projectile lodging in backing. The third, with an angle of fire of 14°, penetrated through plate, projectile breaking up. This plate is still retained at this station for use n testing 4, 5, and 6 inch armor-piercing shells; and has since been attacked by fourteen projectiles.

The *Amphitrite's* second half 9-inch nickel-steel belt armor plate No. A–401 was destroyed in test of three Carpenter and two Wheeler-Sterling 8-inch and two Carpenter 5-inch armor-piercing projectiles.

A special ballistic test of a chrome steel 3-pounder shield, mark II, mounted as it would be in service, eleven-sixteenths inch thick, was made by firing twelve 1-pounder armor-piercing shells, with different striking velocities, varying from 1,238 to 1,750 foot seconds, but at different angles of impact. Projectiles got through shield at an angle of 40° with the higher velocities.

An experimental test of a chrome steel shield plate, 1 inch thick, received from the Wheeler-Sterling Steel Company, supported at its sides without backing, was made March 1, 1894. One 3-pounder armor-piercing projectile, with a striking velocity of 1,075 foot seconds, went clear through the middle of the plate, star-cracking it into five pieces.

A test was made of an experimental 10½-inch Harveyized nickel-steel plate, furnished by the Carnegie Steel Company. Carpenter 8-inch armor-piercing projectile, with striking velocity of 1,841 foot seconds smashed on plate; estimated penetration about 3¼ inches. Eight-inch Holtzer armor-piercing projectile, with striking velocity of 2,000 foot seconds, smashed on plate; point and ogive welded in. A Johnson 10-inch cast-steel shot, with striking velocity of 1,500 foot seconds, broke up, point welded in; penetration, about 6 inches.

A 12-inch experimental Harveyized nickel-steel plate, A–746, Carnegie Steel Company, was tested and broken up, using 10-inch Johnson cast-steel shot and Carpenter armor-piercing projectiles.

An experimental test of a 6-inch curved Harveyized nickel-steel plate, A–873, of group 13, Carnegie Steel Company, rejected on inspection on account of surface cracks and afterwards presented to the Government for experimental test, was made. This plate was attacked at different times, with and without backing, by four 6-inch armor-piercing projectiles, two with striking velocities of 1,800 foot seconds, and two of 2,000 foot seconds. The surface cracks were not changed in dimensions by the firing, although they were close to the impacts, and the projectiles failed to get entirely through the plate, although the four impacts were close together.

A comparative test of the top half (second half) of *Terror's* 7-inch nickel-steel side armor plate, A–531, group 10, Carnegie Steel Company, was made June 16, 1894, the projectiles, striking velocities, etc.,

being as nearly similar as possible to the test of the other half of the plate. This plate behaved equally well, if not better than the first half.

A comparative test of the top half (second half) of *Monadnock's* 9-inch nickel-steel plate, A-468, group 9, Carnegie Steel Company, was made June 16, 1894. The striking velocities, etc., being as nearly the same as possible as those of the test of the first half of the same plate. This plate resisted the attack of the projectiles as well if not better, than the first half.

A comparative test of the top half (second half) of *Oregon's* 8-inch curved nickel-steel plate, A-619, group 11, Carnegie Steel Company, was made June 23, 1894, the striking velocities, etc., being nearly the same as those in the test of the first half, an allowance being made for a difference of thickness of 7 inches in the backing of the two plates. This plate withstood the attack of the projectiles as well if not better than the other half.

The second half of the *New York's* 4-inch nickel-steel side armor plate, from the Carnegie Steel Company, has been in use during the whole year for the test of 4 and 5 inch projectiles, and has now received twenty-four impacts of these projectiles, with room for still more, the plate being still uncracked, although slightly dished in places.

Six-inch all-steel plate, A-908, from the Carnegie Steel Company, made for test of projectiles, has withstood six impacts of 5-inch projectiles, one of 8-inch, and one 12-inch deck-piercer, the latter shot wrecking the right-hand upper corner of the plate. At least one half of this plate is still fit for use.

A *Texas* 12-inch nickel-steel redoubt plate, 4247-B1, which was tested ballistically at Bethlehem Iron Works and then sent here for test of projectiles, was destroyed in the test of four 13-inch and two 12-inch armor-piercing projectiles.

PROOF OF GUNS, BREECH MECHANISMS, ETC.

The following guns have been proved with service rounds, most of these proof rounds having been fired during tests of powder, projectiles, cases, and in experimental work:

Six-pounder Driggs field guns Nos. 6, 7, 8, 9, 10, and 11.

Three-inch field gun with Fletcher mechanism, No. 1.

Four-inch R. F. guns Nos. 22, 23, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, and 33.

Five-inch R. F. guns Nos. 29, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, and 57.

Six-inch R. F. gun with Fletcher breech mechanism, No. 135.

Six-inch B. L. R's Nos. 121 and 128.

Eight-inch B. L. R's Nos. 33, 34, 35, 36, and 37.

Ten-inch B. L. R's Nos. 12 and 13.

Twelve-inch B. L. R's Nos. 3 and 8.

Thirteen-inch B. L. R. No. 2.

Four-inch R. F. G. No. 59, fitted with liner in chamber, was fired thirty-four times in proof, and then issued to service.

Four-inch R. F. G. No. 74, made of defective forgings, has been fired twenty-nine times, and is to be retained as a station gun.

Four-inch R. F. G. No. 33, with liner in chamber, was tested, returned to the gun factory for examination on account of cases sticking in the chamber, was relined, and subjected to further test with some high pressures, and has finally passed proof.

BREECH MECHANISMS.

The breech mechanism for the rapid-fire guns has continued to work well.

The Fletcher rapid-fire mechanism, fitted to the 6-inch R. F. G., has been tried with thirty-three rounds, and has been found efficient.

A 6-inch R. F. G. has also been fitted with the Dashiell mechanism, and the two mechanisms can soon be compared under service conditions.

The breech mechanism for the 12 and 13 inch guns has worked properly. With the closed-in worm shaft, however, some trouble has been experienced by the galling of the end of the shaft, or of the socket in which it works. This can be obviated by making the shaft of phos phor-bronze, or some other metal than steel, and boring oil holes.

A successful test has been made of a new front gas check disc in the 12 and 13 inch breech mechanisms. This disc is recessed into the rear face of the mushroom, contains much less metal, is easier and cheaper to manufacture, checks gas as well under pressure as the old form, and is much easier handled.

A split front gas check disc has been tried in an 8-inch B. L. R., and has checked gas properly under severe pressures.

A very efficient electric attachment has been developed for the breech mechanism of the 5-inch R. F. G., and at present these guns are fired entirely by electricity at this station. The change can be quickly made from electric firing to the regular percussion firing.

The service firing locks have performed as usual, one or two having been rendered unserviceable by very high pressures.

An electric battery consisting of four Exeter dry cells has been attached to a 6-inch and also to a 13-inch mount for use in electric firing, and so far has performed well, gives a sufficient current to explode any primer in use, and is unharmed by the shock of the firing.

SMALL-ARM RIFLE BARRELS.

A comparative test of five 6 mm. small-arm rifle barrels of the caliber intended for the Navy was made at the proving ground. The barrels were marked A, of Bethlehem nickel steel; B, of Bethlehem simple steel; C, of carpenter simple steel; M-1 and M-5, both of Midvale steel, composition unknown. Ammunition loaded with 36 grains Rifleite powder, some by weight and some by measure, was used; and the relative values of the barrel materials was determined by firing 1,000 rounds from each, measuring the velocities, gauging, examining, measuring, and weighing the barrels after each 250 rounds. Barrels B and C were withdrawn after the first 250 rounds, showing themselves much inferior to the other three, and at the end of the thousand rounds the three remaining barrels passed the test in the following order: M-1 first, A- second, and M-5 third. The mean velocities of ten rounds of ammunition with the new barrels at beginning of test was 2,457.2 foot seconds, ammunition loaded by weight; and the mean velocities of ten rounds of the three barrels at the end of the thousand rounds was 2,406.5 foot seconds.

GUN MOUNTS.

The following gun mounts of different calibers have been tested during the year:

For 4-inch R. F. guns, C. P. mounts Nos. 23, 41, 54, 62, 63, 64, and 73. Also twin 4-inch mount No. 1.

Five-inch R. F. mounts Nos. 23, 33, 34, 35, 43, and 50.

Eight-inch: *Olympia's* 8-inch twin turret mounts No. 1 left, No. 20 right, and No. 26 left and 25 right.

Ten-inch hydraulic mounts: *Amphitrite's* No. 11 Mark II, *Amphitrite's* No. 13 Mark II, and *Maine's* No. 12 Mark III.

Twelve-inch: No. 4 *Puritan's* Mark I; No. 8 *Texas* Mark II is now at the station undergoing proof.

Thirteen-inch: No. 1 Mark I.

These mounts stood the proof firing very well.

During the firing the running-out motors in 10-inch hydraulic mount No. 12 were burst—probably on account of the running-out valves not being entirely opened. Some difficulty has been experienced with several of the hydraulic rammers of the turret mounts. They have on several occasions clogged with dirt; and on one occasion the inner orifices were closed by the water freezing in them while in use during very cold weather.

TESTS OF PROJECTILES.

The following armor-piercing projectiles were tested and accepted during the year:

Carpenter shell.—Four-inch, lots 1, 2, 3, 4, and 5; 5-inch, lots 1, 2, and 3; 6-inch, lot 2-B; 8-inch, lots 3-B and 4-B; 10-inch, lot 19; 12-inch, lots 3, 4, and 5; 13-inch, lots 1, 2, and 3.

Wheeler-Sterling armor-piercing shell.—Four-inch, lots 1, 2, 3, 4, and 5; 5-inch, lots 1, 2, 3, and 4; 8-inch, lot 2; 10-inch, lots 1, 2, and 3; 12-inch, lots 1, 2, and 3; also one lot of semiarmor-piercing or deck-piercing shell; 13-inch lots 1 and 2.

American Projectile Company's wrought-steel common shell and shrapnel.—Four-inch (shrapnel), lot 1; 5-inch, common shell, lots 1, 2, 3, 4, and 5.

Taylor cast-steel common shell.—Ten-inch, lots 1, 2, 3, and 4; 12-inch, lots 1, 2, 3, and 4.

EXPERIMENTAL AND MISCELLANEOUS TESTS.

Carpenter shell.—One Carpenter 8-inch cast-steel shell was tested against a 4-inch nickel-steel plate. Penetrated, but broke up.

A Carpenter 8-inch armor-piercing shell was fired at a 12-inch nickel-steel Harveyized plate with a striking velocity of 2,004 foot seconds, with line of fire making an angle of 30 degrees at point of impact. Projectile glanced, cutting out a gouge 4.5 inches deep, 13 inches long, 10 inches wide, and broke up.

A Carpenter 10-inch armor-piercing shell was fired at same plate at an angle of 35 degrees and striking velocity of 1,977 foot seconds. Gouged out a hole 7.5 inches deep, 18 inches long, 12 inches wide, the shell breaking up, and the plate badly cracked.

A 10-inch Carpenter armor-piercing shell was fired normally at same plate with striking velocity of 1,681 foot seconds. Projectile broke up, giving estimated penetration of 9 inches, and cracked plate.

One Carpenter 6-inch armor-piercing shell was fired normally at an 18-inch Harveyized plate with striking velocity of 2,000 foot seconds, breaking up and giving an estimated penetration of from 3 to 4 inches.

Wheeler-Sterling projectiles.—An experimental 8-inch Wheeler-Sterling armor-piercing shell with hemispherical head was tried against a 12-inch nickel-steel Harveyized plate, behaving similarly to other armor-piercing shell.

Two 12-inch Wheeler-Sterling armor-piercing shells were tested experimentally, one failing entirely and the other behaving satisfactorily.

No. 26, lot 1, Wheeler-Sterling 12-inch armor-piercing projectile having behaved extraordinarily well in an attack against a Carnegie 17-inch Harveyized nickel-steel plate, another projectile of the same lot was fired against an 18-inch nickel-steel Harveyized plate of the Bethlehem Iron Company, with ordinary results.

American Projectile Company's shell.—A test of four 3-pounder and four 6-pounder Harveyized steel shells were fired with service velocities against an annealed 2 and 3 inch steel deck plates. In every case portions of the shell succeeded in getting through, though the shell broke up.

A number of 4, 5, and 6 inch steel common shells and shrapnel were tested experimentally for this company.

Taylor shell.—Tested one 8-inch Taylor cast-steel common shell at a 4-inch nickel-steel deck plate. Projectile smashed on plate with no penetration. Tested similar projectile against 3-inch annealed steel deck plate. Projectile penetrated plate and broke up. Fired two more 8-inch cast-steel common shells of slightly different design against a 4 inch nickel-steel plate. Both shells penetrated, but broke up.

Hadfield shell.—Two Hadfield 6-inch armor-piercing projectiles were tested against a 6-inch all-steel plate. Both projectiles broke up.

United States Projectile Company's shell.—Fired four 5-inch common steel shell through 3-inch wrought-iron plate. Shell penetrated, but broke up each time. Tested four 6-inch common shells against same 3-inch annealed-steel deck plate. Two penetrated without breaking up; the other failed to penetrate, but remained entire.

Johnson cast-steel shot.—Johnson cast-steel shot 1-B, 2-B, 3, and 4 were fired against a 10-inch nickel-steel plate with striking velocities varying from 1,400 to 1,570 foot seconds; penetrated plate, remaining entire and very little deformed. No. 4 was lost overboard and not recovered.

Johnson cast-steel shot B-3, B-5, and B-6 were fired against a 12-inch Harveyized nickel-steel plate with velocity of 1,600 foot seconds, and failed. B-3 was fitted with a soft-steel cylindrical cap which covered and protected the point. This cap materially assisted in preserving the shape of the point, and increased the penetration over that of the other two.

Gun-cotton shells.—Ten 6-inch steel common shells loaded with gun cotton and fitted with fulminate detonators in dry gun-cotton discs have been received from the torpedo station. Four of these projectiles have been fired. Two were fired into a clay bank with striking velocity of 1,250 foot seconds. The detonators worked well, and the shell exploded with good mining effect. One shell was fired at 7-inch nickel-steel plate with same velocity; burst on face of plate, injuring it very slightly. One shell fired with a striking velocity of 1,700 foot seconds broke up or partially detonated in the gun, injuring the lands and grooves, but not rendering it entirely unserviceable.

Burster bags and shell.—Comparative tests were made in loading common shell with one large or a number of smaller burster bags, and without any bags at all. A much longer time was required to load the shell with small bags; less powder could be gotten into the shell; and there was very little practical difference in the explosive effect. A large number of projectiles have been fired at the station without using burster bags at all, with no premature explosions.

Explosion chamber.—A number of projectiles of different calibers, and furnished by different companies, have been burst in the explosion chamber in the tests of shell, shrapnel, and also of shell powder.

Fuses.—A time fuse of the American Projectile Company was tested and gave fair results, fifteen service rounds being fired. The same fuse

was also tested as a combination time and percussion, two rounds being fired, with one premature explosion near muzzle of gun.

A hydraulic time fuse invented by Mr. Smith was tested with fifteen rounds at various times. At first the fuse failed to explode when fired from a gun nearly every time, although working properly when set off by hand. By reducing the pressure necessary to move the detent, and by putting a thin perforated plate over the primer to retain it in position, the two last shells fired burst in excellent time.

The service-base percussion fuse was tested in connection with the test of large and small burster bags, eleven rounds being fired at a 3-inch plank screen faced with a three-eighths-inch iron plate. Five of these rounds were fired with a striking velocity of 1,000 foot seconds with no explosion. Six rounds were then fired at same target with four explosions—three with large burster bags and one with small; the other two shells, filled with small buster bags, failed to explode.

Cartridge cases.—Five-inch cases, representing lots from 1 to 48, furnished by the Winchester Repeating Arms Company, have been tested with six rounds each, with maximum service pressures, and all the lots accepted. These cases all shortened somewhat on being fired a number of times.

Four 6-inch experimental R. F. G. cases have been tested for the same company. At first the cases collapsed badly in different places along the body on firing. Wooden blocks were then used in the mouths of the cases, and worked fairly well; but later the company furnished drawn-brass cups, made to fit nicely into the mouth of the case, with concave side in. These remedied the collapsing almost entirely, and answer the purpose excellently for sealing the mouth of the case when loaded, as the projectile does not go into the case with this caliber.

In service here at the proving ground, the average number of rounds fired from 4-inch cases before they are rendered unserviceable is between four and five. For 5-inch cases, however, the average is much better, being between fourteen and fifteen before the cases are laid aside for reforming; and there is one 5-inch case on hand which has been fired thirty-three times and is still in good condition.

Solid drawn-brass cartridge cases, representing lots 1, 2, 3, 4, and 5, manufactured by the Union Metallic Cartridge Company for the Driggs Ordnance Company, have been tested with service charges and pressures, and passed the requirements of the specifications.

Sample cases, representing a lot of 3,000 3-inch solid drawn-brass cases, made by the Winchester Repeating Arms Company, have been tested in the Fletcher 3-inch field gun, but their final acceptance has not yet been decided upon.

Primers.—The percussion primers, both for the rapid-fire and also for the B. L. rifles, have continued to give satisfaction.

Some trouble has occasionally occurred with the friction primers, especially when using a long lanyard from a bombproof. For some reason the wires break off quite often with the long lanyard.

The double wire, and later the single wire, electric primers, manufactured by the torpedo station for use in firing the B. L. rifles, have given entire satisfaction of late.

A number of experimental electric primers of different designs for R. F. guns have been tested, difficulty being found at first in preventing gas leaks and serious blow backs. The primers now furnished by the Winchester Repeating Arms Company for test with their 5-inch cases have all passed satisfactorily, with one or two exceptions. They explode on first contact and check gas properly.

Ballistic test of castings.—The following steel castings have been tested ballistically since last annual report:

Thirteen 4-inch pivot stands accepted, nine rejected; two 4-inch top carriages accepted, none rejected; four 5-inch pivot stands accepted, fteen rejected; nine 5-inch top carriages accepted, one rejected; five inch oscillating slides accepted, one rejected; four 6-inch deck circles ccepted, five rejected; one 6-inch pivot stand rejected; four 8-inch box lides accepted; two 10-inch deck lugs accepted; one 12-inch deck lug ccepted; one 12-inch box slide accepted; two 13-inch deck lugs accepted; ne 13-inch deck slide accepted. Making eighty castings tested in all, f which forty-eight were accepted and thirty-two rejected.

POWDER.

Ordinary service powders.—During the year Messrs. E. I. Du Pont & o. have furnished under contracts brown prismatic powders for the 3, 12, 10, and 8 inch B. L. R's, and 5 and 4 inch R. F. G's, black uick burning prismatic ignition powder, black cubical or square-grain owders for the 6 and 3 pounders, and fine-grain black powders for the -pounder. These have been tested with varying results. About one-alf the brown prismatic powders and the fine-grain black powders have een rejected for service use. The trouble with the brown powder has generally been that it was too quick, giving the velocity, but with excessive pressure, while the fine-grain powder for the heavy 1-pounder has been too slow or too weak.

The following is a detailed statement by calibers:

Thirteen-inch B. L. R.—W. S., lot 1, W. S., lot 2, and W. S., lot 3, were all rejected for that gun, being too quick. W. S.-1 and W. S.-3 were also tested in the 12-inch B. L. R., the former being too quick for the 12-inch, while the latter was accepted for that gun.

The specification velocity, 2,100 foot seconds, for the 13-inch seems to be too high, in the present stage of development of brown powder, for the heavy calibers, the velocity for a 35-caliber 12-inch gun being 2,000 foot seconds.

Twelve-inch B. L. R.—V. Y., lot 7, and V. Y., lot 8, were tested in the 12-inch gun, the former being accepted, while the latter was rejected as being too quick, as well as irregular in velocity and pressure.

Ten-inch B. L. R.—U. F., lot 30, and U. F., lot 31, have been presented for test, and the former lot rejected, being too quick. The latter lot is quite regular as to velocity, but the pressure is a little above the limit and its final acceptance has not yet been decided upon until after further tests.

Eight-inch B. L. R.—Of the lots tested in the 8-inch B. L. R., U. T. ots 26, 31, 32, and 33 were accepted, while U. T. lots 27, 28, 29, and 30 ere rejected, being too quick. Of the lots accepted all barely passed he terms of the specifications.

Five-inch R. F. gun.—Sixteen lots of small grain prismatic powder ave been tested in the 5-inch R. F. G.: V. Z. 11 to V. Z. 26. Of these ly two lots, V. Z. 12 and V. Z. 14, have been accepted, each of which ll slightly below the terms of the specifications. Sample lots V. Z. 11, Z. 13, V. Z. 15, and V. Z. 16 were too slow, while the remainder were o quick.

Four-inch R. F. gun.—Only one lot, W. G. 6, has been tested in the ch gun, and was accepted.

Ignition powder.—Black, prismatic, quick-burning ignition powders X. F., lot 3 for Mark III, B. L. R's, and W. C. lot 4, for the 5-inch F. gun, have been tested and accepted.

Six-pounder.—All lots of black cubical or square-grain powders, tested in the 6-pounder, have been accepted, viz, U. D. lots 21, 22, 23, 24, 25, 26, 27, and 28.

Heavy 1-pounder.—W. A. lots 5, 6, 7, 8, 9, and 12 were tested and rejected as being too slow, irregular, or too weak; while W. A. lots 10, 11, and 13 were accepted, but not until the specification velocity was reduced by 50 foot seconds, while the maximum charge was limited to 130 grams.

Light 1-pounder or 37 mm. R. C.—Two lots, N. X. I., lots 7 and 8, have been tested in the 37 mm. R. C. and accepted.

The Messrs. Du Pont have also submitted for test three experimental samples for the 5-inch R. F. G., A, B, and C, all of which failed to meet service requirements; and one sample, D, for test in the 6-inch B. L. R., which barely passed the requirements for service powder. This latter sample seemed to be a blended powder for the 8-inch gun, and too quick for that caliber.

Messrs. Laflin & Rand have presented for experimental purposes and their own information one lot L. C. 1 for the 6-inch B. L. R., one lot L. A. 1 for the 4-inch R. F., and three lots of L. H. 1, L. H. 2, and L. H. 3 for the heavy 1-pounder. L. C. 1 gave in the 35 caliber 6-inch B. L. R., using a charge of 49 pounds and 100 pounds projectile, a muzzle velocity of 2,039 foot seconds, and for chamber pressure 14.2 tons. L. A. 1 in .40 caliber 4-inch R. F. gun, using a charge of 12½ pounds with 33 pounds shell, gave a muzzle velocity of 1,896 foot seconds and 14.9 tons pressure.

L. H. 3 was the only sample coming up to the requirements for the heavy 1-pounder, a charge of 130 grams giving a muzzle velocity of 1,765 foot seconds and 9.9 tons pressure. L. C. 1 and L. A. 1 were black pierced prismatic powders of same size grain as the standard brown prismatic powder. They were dusty, igniting easily, and on firing gave off a large amount of disagreeable, heavy black smoke, also leaving a great deal of residue in the chamber of the gun. Neither would have been satisfactory for service use had they passed the velocity and pressure requirements.

The following table will illustrate the work done with ordinary powders during the year (September 13, 1893, to September 8, 1894):

Table showing work done with all powders (not smokeless) during the year.

Gun.	Du Pont's powder tested and accepted.	Du Pont's powder tested and rejected.	Total rounds fired, all powders for all purposes.	Total powder expended, all purposes.
	Pounds.	*Pounds.*		*Pounds.*
13-inch	.....	30,000	20	7,792
12-inch	50,000	25,000	38	13,160
10-inch	.....	25,000	41	7,932
8-inch	105,000	100,000	92	8,470
6-inch	.....	.....	149	5,910
5-inch	40,000	169,000	436	10,004
4-inch	15,000	.....	197	2,161
Field 3-inch	.....	.....	35	41
6-pounder	*61,500	.....	348	595
3-pounder	.....	.....	50	78
47 mm. R. C	.....	.....	96	47
Heavy 1-pounder	†7,125	8,250	221	59
37 mm. R. C	‡7,000	.....	52	10
Ignition	6,000	.....	.....	722
Total	345,625	437,250	1,775	56,981

* 16,500 pounds for private firms.

† 2,125 pounds for private firms.

‡ *All for private firms.* These private firms engaged in putting up fixed ammunition for the Government.

RETURNED AMMUNITION.

During the year the following returned ammunition has been retested:

Atlanta's 8-inch full charges, C/82, index 18, originally tested October, 1886; 6-inch charges O. P., index 19, originally tested February, 1887; C/82, index 17, originally tested October, 1886, were all found to be in good condition. The charge for the 8-inch remained unchanged, while the 6-inch charges were broken up, and reduced charges fixed for Mark III 6-inch B. L. R. The 6-pounder, 3-pounder, 47 mm. R. C., and 37 mm. R. C., were all found to be good and recommended for reissue except that for the 47 mm.

San Francisco's 6-inch full charges S. M. A-16, index 70, originally tested December, 1889, and S. M. A-18, index 73, originally tested February, 1890, were found to give much reduced velocities; but full charges were calculated and recommended; 6-inch reduced charges S. M. A-19, index 74, originally tested February, 1890, were found to be in good condition, giving a slightly higher velocity than the service. The 6-pounder, 3-pounder, and 37 mm. R. C., were all found fit for reissue.

Newark's 6-inch full charges S. M. A-25, index 83, originally tested June, 1890; S. M. A-28, index 90, originally tested December, 1890; S. M. A-29, index 91, originally tested January, 1891, and S. M. A-30, index 95, originally tested February, 1891, all gave much reduced velocities with lower pressures. All showed evidences of having been damp, saltpetre being found on the grains, and some were moldy.

Miantonomoh's 10-inch, full charges, index 115, originally tested August, 1891, and index 134, originally tested January, 1892, were tested in 30 caliber 10-inch B. L. R. The former gave very reduced velocities; and a reduced charge was fixed. The latter gave a velocity but little below that when originally tested, and was recommended for reissue without change.

Winchester Repeating Arms Company, check samples, 3-pounder powder T. W-12, index 173, had the charge refixed.

Heavy 1-pounder powder W. A-4, index 161, not being satisfactory in that gun, was retested in the 37 mm. revolving cannon and charge fixed.

A retest of Du Pont's 6-inch powders S. M. A-40, index 141, originally tested April, 1892, and S. M. A-43, index 163, originally tested April, 1893, was made, and the velocities and pressures were found to correspond with those in the original test.

Schaghticoke and Hazard shell powders, 1874, were retested by using them as bursting charges for 6-inch shell, and found to be good.

SMOKELESS POWDERS.

Smokeless powders from the U. S. Naval Torpedo Station, the Leonard Smokeless Powder Company, New York; the Troisdorf (through Laflin & Rand Powder Company), and the Walsrode Smokeless Powder Company, Red Bank, N. J., have been tested from time to time, as received, in all calibers for which manufactured up to and including the 8-inch B. L. R. The results of these tests are given below:

Table showing characteristic velocities and pressures of samples of torpedo station smokeless powders tested during the year.

Gun.	Powder.	Charge.	Projectile.	Muzzle velocity.	Pressure.	Remarks.
		Grams.	*Pounds.*	*Ft. secs.*	*Tons.*	
6-pounder (40 caliber)	MN-2, No. 188 (in sticks).	500	6	2,211	16.2	Practically smokeless.
Do	do	500	6	2,176	13.6	Do.
Do	do	450	6	2,157	19.7	Fired after 6 months' storage. Very sharp report.
Do	MN-2, No. 190 (in sticks).	500	6	1,807	8.8	Nearly smokeless. Charge not all burned.
Do	MN-2, No. 192 (in sticks).	460	6	1,834	10.0	Discharge smokeless. Yellow fumes in bore. Charge not all burned.
Do	MN-2, No. 192 (hexagonal grains).	400	6	2,000	15.5	Discharge smokeless. Yellow fumes in bore. Charge all burned.
3-pounder (40 caliber)	MN-2, No. 192 (in sticks).	425	3.3	2,000	8.6	Nearly smokeless. Flame from muzzle. Charge not all burned.
Do	MN-2, No. 192 (hexagonal grains).	320	3.3	2,043	11.9	Discharge smokeless. Dirty yellow fumes in bore. Charge all burned. Bore clean and dry.
Do	do	350	3.3	2,213	14.7	
Do	MN-1, No. 191 (sticks).	400	3.3	2,295	13.1	Smokeless. Charge all burned. Sharp report.
Do	do	400	3.3	2,291	13.3	Do.
		Pounds.				
4-inch R. F. (40 caliber).	MN-3, No. 188 (sticks).	5¼	33	2,124	14.1	Discharge nearly smokeless.
Do	do	5¼	33	2,023	14.8	Do.
Do	MN-3, No. 189 (sticks).	6	33	2,148	13.9	Do.
Do	do	6	33	2,075	14.6	Do.
Do	MN-3, No. 190 (sticks).	5⅝	33	2,069	14.4	Discharge nearly smokeless. Bright flame from muzzle. Yellow, unpleasant fumes.
Do	K-4 (strips)	6	33	1,835	8.6	Nearly smokeless.
Do	do	7	33	2,071	11.6	Do.
Do	K-5 (cords)	5¾	33	2,039	13.8	Do.
Do	do	6	33	2,100	15.5	Do.
Do	K-7, DP. 80-75.	6	33	1,714	7.6	Do.
Do	do	8	33	2,133	12.4	Nearly smokeless. Dirty blue fumes in bore.
Do	do	8	33	2,174	12.5	Nearly smokeless.
Do	K-7, rolled and not dipped.	6	33	1,711	7.6	Do.
Do	do	8⅜	33	2,247	14.9	Do.
Do	K-7, rolled and dipped.	6¾	33	1,839	8.7	Do.
Do	K-8 (grooved), strips 3.9 inches by 0.56 inch by 0.05 inch.	6	33	1,809	8.7	Do.
Do	do	7½	33	2,133	13.4	Do.
Do	do	7½	33	2,145	13.2	Do.
Do	do	8	33	2,280	17.2	Do.
Do	K-8 (grooved), sticks 24 inches long.	7½	33	2,211	14.5	Do.
Do	K-8 (not grooved), strips 3.9 inches by 0.56 inch by 0.05 inch.	7½	33	1,932	10	Do.
		Grams.				
6-pounder (40 caliber)	K-7 (grooved), strips 9.2 inches by 1.2 inches by 0.025 inch	500	6	1,820	9.9	Do.

Table showing characteristic velocities and pressures of samples of torpedo station smokeless powders tested during the year—Continued.

Gun.	Powder.	Charge.	Projectile.	Muzzle velocity.	Pressure.	Remarks.
		Grams.	*Pounds.*	*Ft. secs.*	*Tons.*	
6-pounder (40 caliber).	K-7 (grooved), strips 9.2 inches by 1.2 inches by 0.025 inch.	550	6	2,021	13.9	Nearly smokeless.
Do	do	600	6	2,131	14.7	Do.
Do	K-8 (grooved), strips 9.2 inches by 1.2 inches by 0.025 inch.	500	6	2,024	12.4	Do.
Do	do	550	6	2,148	12.6	Do.
Do	do	575	6	2,246	17.1	Do.
Do	K-9 (grooved), strips 9.2 inches by 1.2 inches by 0.025 inch.	500	6	1,923	11.8	Do.
3-pounder (40 caliber).	K-5 (cords)	475	3.3	1,716	9.1	Practically smokeless.
Do	K-7 (grooved), strips 6.2 inches by 1.2 inches by 0.025 inch.	475	3.3	2,351	14.2	Nearly smokeless.
Do	do	475	3.3	2,351	13.2	Do.
Do	K-8 (grooved), strips 6.2 inches by 1.2 inches by 0.025 inch.	475	3.3	2,348	13.8	Do.
Do	do	490	3.3	2,477	14.9	Do.
Do	do	490	3.3	2,477	(*)	Do.
Do	K-9 (grooved), strips 12 inches by 1.2 inches by 0.025 inch.	400	3.3	1,963	8.7	Do.
1-pounder (40 caliber).	K-7 (grooved), strips 3.9 inches by 1.17 inches by 0.025 inch.	125	1	1,735	6.0	Smokeless.
Do	K-8 (grooved), strips 3.9 inches by 1.17 inches by 0.025 inch.	125	1	2,114	7.0	Practically smokeless.
Do	do	125	1	2,034	(*)	Do.

* Not observed.

By consideration of the above it will be seen that K-8 was the best sample of all. Within the service limits of pressure for each caliber, 2,200 foot seconds in the 4-inch gun, 2,200 foot seconds in the 6-pounder, 2,475 foot seconds in the 3-pounder, and 2,050 foot seconds in the 1-pounder could be easily obtained; the record in the .40-caliber 3-pounder R. F. G. being one of the best ever obtained anywhere in that gun. None of this powder has been subjected to a keeping test at this station for over three or four months, but there is every reason to believe that a powder similar to K-8 will keep.

LEONARD SMOKELESS POWDER.

The Leonard Smokeless Powder Company, of New York, have furnished special samples for the Navy for test in the 4-inch R. F. and 8-inch B. L. R.

Table showing characteristic velocities and pressures of samples of Leonard smokeless powders tested during the year.

Gun.	Powder.	Charge.	Projectile.	Muzzle velocity.	Pressure.	Remarks.
		Pounds.	*Pounds.*	*Ft. sec.*	*Tons.*	
4-inch R. F. (.40 caliber).	Leonard smokeless; cylindrical sticks 24 inches long, one-half inch diameter.	7	33	2,054	7.9	Practically smokeless. Small amount black fumes in bore. Heavy report. Gun hot.
Do	do	11	33	2,537	14.2	Do.
Do	do	12	33	2,736	17.7	Do.
8-inch B. L. R. (.40 caliber).	Leonard smokeless; cylindrical sticks 21½ inches long, three-fourths inch diameter.	50½	250	2,037	7.7	Flame from muzzle. Very heavy report.
Do	do	75	250	2,452	11.6	Do.
Do	do	85	250	2,650	14.8	Do.

This powder comes in solid cylindrical sticks, more or less pliable and of a brownish color. It is usually coated with boiled linseed or cotton-seed oil, and the last sample received was apparently dusted with graphite. It explodes with a sharp report when struck with a hammer on an anvil. The exact composition of this powder is not known, but it certainly has from 65 to 75 per cent nitroglycerine in its composition. It is claimed that this powder is stable and safe to handle. No keeping test of over three or four months has been made at this station, but so far there seems to be no change in that on hand. How it will stand the test of very cold weather remains to be seen. The results in using Leonard smokeless powder are certainly very satisfactory as to velocity, and within limits, as to pressure. It requires a small igniting charge of quick-burning black or smokeless powder. During the tests of this powder about 50 grams of musket powder were used in the 4-inch, and about 25 grams in the 8-inch, as an ignition powder. This powder was placed in a cheese-cloth tube with small disk at rear end, going in center of sticks of powder.

FOREIGN SMOKELESS POWDERS.

Troisdorf smokeless powder, as received at this station, was in black square grains, about 0.2 inch square and .03 to .04 inch thick. It was apparently glazed with plumbago. On opening the hermetically sealed cans in which it was shipped, there was a decided smell of ether. These grains explode when struck with a hammer on an anvil. A small priming charge of black musket powder was used in the test of this powder. The results are not satisfactory, as the velocities are much below the standard for brown prismatic powders.

Table showing characteristic velocities and pressures of Troisdorf smokeless powders tested during the year.

Gun.	Powder.	Charge.	Projectile.	Muzzle velocity.	Pressure.	Remarks.
		Lbs.	*Lbs.*	*Ft. secs.*	*Tons.*	
5-inch R. F. (.40-caliber).	Troisdorf No. 29, flat square grain.	5	50	1,652	6.9	Practically smokeless; black fumes in bore.
Do	do	7¾	50	2,135	14.0	Same; bright flame from muzzle, increasing in length with increase of charge.
Do	do	7¾	50	2,164	14.9	Do.
6-inch B. L. R. (.35-caliber).	do	12¾	100	1,904	15.9	Do.

Walsrode smokeless powder has been tested in the 4-inch, 6-pounder, 3-pounder, and heavy 1-pounder R. F. guns, using samples named, cannon No. 32 (for guns 7.5 cm. to 9 cm.) and cannon No. 72 (for guns over 9 cm.). The initial powder used was also a Walsrode smokeless powder, called blank fire or initial powder. Cannon Nos. 32 and 72 were in small square grains, about 0.2 inch square and from 0.025 inch to 0.04 inch thick. It is apparently glazed, having a shiny black surface, and has a smell of ether. The blank fire or initial powder is a cream-colored fine grain powder of an aromatic-ether smell. Both it and the cannon can be exploded by a sharp blow of a hammer on an anvil. This powder is presumably made of Walsrode gun cotton and ether alcohol. The results of cannon No. 32 were the most satisfactory in the .40-caliber 1-pounder. The Walsrode initial powder in the smaller calibers seems to play quite an important part as to pressure, and is evidently a very strong powder, probably from three to seven times as strong as black musket powder; and for this reason trial was also made in the 1-pounder, using ordinary black musket powder for ignition, with results more satisfactory as to pressure, although there was some smoke of discharge on account of it.

Table showing some of the characteristic velocities and pressures of the Walsrode smokeless powders.

Gun.	Powder.	Charge.	Projectile.	Muzzle velocity.	Pressure.	Remarks.
		Lbs.	*Lbs.*	*Ft. secs.*	*Tons.*	
4-inch R. F. (.40-caliber).	Walsrode smokeless, cannon No. 72.	3¾	33	1,707	10	Discharge smokeless; bright flame from muzzle; black fumes in bore.
Do	do	4¼	33	1,847	12.7	Do.
		Grams.				
6-pounder (.40-caliber).	do	250	6	1,307	5.9	Discharge smokeless; no flame from muzzle; charge not all burned.
Do	Walsrode smokeless, cannon No. 32.	250	6	1,547	7.6	Discharge smokeless.
Do	do	350	6	1,930	21.7	Do.
3-pounder (.40-caliber).	do	190	3.3	1,926	15.9	Do.
1-pounder (.40-caliber).	do	45	1	2,007	12.7	20 grams of Walsrode initial powder used.
Do	do	85	1	2,023	8	Discharge nearly smokeless; 10 grams black musket powder for initial.

EFFECT ON GUN OF SMOKELESS POWDER.

The effect on the gun of smokeless powders of course varies with each powder. They all seem to heat the gun more than the black or brown powders, those containing nitroglycerine heating the most. The torpedo-station gun-cotton smokeless powders rarely heat the gun so hot that the bare hand will suffer when placed on the exterior near the muzzle. With the Leonard smokeless powder, after three or four rounds have been fired, especially with large charges, the gun is smoking hot. The smokeless powders foul the gun less than ordinary powders, and there is no deposit of powder residue left in the chamber or at the shot seat to prevent the next projectile going home easily, or to cause any danger from setting fire to the next charge, and the bore is always much cleaner. The smokeless powders, however, which generate the most heat melt the copper rotating bands of the projectiles and partially coat the bore with it. Other smokeless powders, such as the

Leonard, which has been glazed or coated with graphite, leave a coating of graphite in the bore. Neither of these affect the ballistics of the gun, the only difficulty being to clean out the deposit after the firing is suspended. After the test of Leonard smokeless in the 8-inch gun it became finally necessary to fire another round with ordinary powder to make the shell clean the bore, as it could not be cleaned by sponging, using either water or oil or lye. The pressure along the bore of the gun must be quite different with the smokeless powders from those of ordinary brown powder, and with service pressures in the chamber the pressures near the muzzle are rather high.

IGNITION.

Using ordinary primers, there is not sufficient flame or heat generated to properly ignite the majority of smokeless powders, so that it has been customary at this station to use a fine-grain black powder, placed directly at the bottom of the charge. The following amounts in each caliber generally answer the purpose for ordinary smokeless powders: For the 1-pounder, 5 to 10 grams; for the 3 and 6 pounders, 6 to 10 grams; for the 4 and 5 inch R. F. G's, 20 grams; for the 6 and 8 inch B. L. R's, 25 to 50 grams.

Much larger priming charges seem generally to increase the amount of smoke, and sometimes the pressure, without any appreciable increase in velocity. The Walsrode powder was ignited with a smokeless ignition or initial powder, furnished by the same company, and seems to answer the purpose even better than our fine-grain black powder.

VELOCITIES (ALL POWDERS).

During the year velocities have been taken in the proof of service and experimental powders, fixing of charges for proving-ground work, fixing charges for the field 6-pounder R. F. and field 3-inch R. F. guns, with ammunition for the new small-arm rifle (6 mm.), machine guns—Gatling, Accles, Gardner, Maxim, and Skoda—and in the test of returned powders and check samples. The majority of the charges for all calibers, excepting small-arm fixed ammunition, were calculated beforehand.

The following is a table showing number of rounds fired for velocity:

Caliber.	Number of rounds fired for velocity (ordinary powder).	Number of rounds fired for velocity (smokeless powder).	Total number of rounds fired for velocity.
13-inch B. L. R.	11	0	11
12-inch B. L. R.	16	0	16
10-inch B. L. R.	16	0	16
8-inch B. L. R.	42	8	50
6 inch B. L. R.	65	5	70
5-inch R. F.	79	32	111
4-inch R. F.	27	61	88
3-inch field	15	0	15
6-pounder Navy	122	41	163
6-pounder field	8	0	8
3-pounder R. F.	30	47	77
47-mm. R. C.	10	0	10
1-pounder (long)	65	77	142
37-mm. R. C.	38	0	38
6.5-mm. and 6-mm. rifle	.....	303	303
Gatling machine	0	10	10
Accles machine	.....	10	10
Gardner machine	0	10	10
Maxim automatic	0	10	10
Skoda automatic	0	10	10
Total	544	624	1,168

Comparative velocities were taken in the .40 and .45 caliber 6-pounder R. F. guns. The sight bars for these guns are graduated for 1,818 foot seconds for the former, and 1,870 foot seconds for the latter. The same ammunition is used in both guns; and to determine whether 1,870 foot seconds could be obtained in the .45-caliber, a series of tests were made, with the following results: Using solid drawn brass cases, services loading, with a good powder, the mean velocity (ten rounds) in the .45-caliber was found to be 1,873.6 foot seconds; and in the .40-caliber, 1,[illegible]23.2 foot seconds.

Standard velocity of the heavy 1-pounder R. F.: After trials of some twelve official samples of fine grain black powder, it was found impossible to obtain the service velocity, 1,800 foot seconds, using a charge that was easily loaded into the case under service conditions. The velocity has therefore been reduced to 1,750 foot seconds with a charge not exceeding 130 grams (powder 1.8 sp. gr.), and this velocity has since been obtained without any great difficulty.

In the tests of the naval torpedo station smokeless powder, and Leonard smokeless powder, the fact has been developed that with our service guns and pressures the following muzzle velocities can be easily obtained with powders that will probably keep, viz: 1-pounder (.40-caliber), 2,000 foot seconds; 3 pounder (.40-caliber), 2,400 foot seconds; 6-pounder (.40-caliber), 2,100 foot seconds; 4-inch (.40-caliber) 2,200 foot seconds; 8-inch (.40-caliber), 2,600 foot seconds, and probably 5-inch (.40-caliber), 2,400 foot seconds; 6-inch (.40-caliber), 2,500 foot seconds, though no powder for these has yet been developed.

A competitive test of the Hotchkiss, Driggs Schroeder, and Sponsel 6-pounder R. F. guns was made at this station, in the presence of a board of officers ordered by the Bureau. In preparing for this test at this station, much difficulty was experienced in fixing a charge which would give 20 tons chamber pressure. It was discovered, after trying a number of samples, that no charge made up of any one of the many different samples of powder on hand would give over 18 or 19 tons in the 6-pounder, and the pressures for the same charge would be irregular. Finally a charge was fixed composed of two powders of different granulation, the fine grain powder being placed at the bottom and the coarse grain on top, taking care that the two did not mix. Thus, 400 grams Schaghticoke shell powder in the bottom of the case and 325 grams Schaghticoke rifle powder on top of it, gave a pressure of 20 tons; and similarly, 400 grams Schaghticoke shell and 300 grams Schaghticoke rifle gave 18 tons pressure, the pressures varying with the weight of the coarser powder. In connection with this test, difficulty with the cylinder pressure gauges was also encountered, first by the walls of the cylinder gripping the piston with the heavy pressures, and second by the pressure gauge being thrown violently against the rifling of the gun—one gun being nearly ruined by the cutting of the lands.

BLASTING.

It was found necessary during the year to break up a number of cracked plates. To facilitate their removal, emmensite was used very efficiently, with a fulminate detonator. No tamping was necessary, the charge being poured into a crack or crevice. A charge of 2 pounds of emmensite was found sufficient to separate heavy pieces weighing as much as 5 tons, which had been slightly cracked.

OFFICERS AND OTHERS EMPLOYED AT THE STATION.

Ensign R. D. Tisdale has been on duty at this station continuously during the whole year.

Ensign N. A. McCully was detached temporarily during the summer, for a two weeks' course of torpedo instruction on the *Cushing;* and was finally detached last month and ordered to duty as assistant inspector of ordnance at Hartford, Conn.

Ensign F. W. Jenkins has been on duty at the station for the whole year, except a temporary absence of two months as assistant inspector of ordnance at Midvale Steel Works.

Ensign M. L. Miller reported for duty in February of the present year.

These officers, by their zeal and ability, have all contributed to the dispatch of business at the station, and they have been able and willing assistants in everything that has taken place.

Gunner P. C. Hanley has been on duty at the station during the whole year, and has performed his duties zealously and intelligently.

Assistant Surg. L. H. Stone reported for duty in November, 1893; and shortly after his arrival a medical outfit was furnished by the Bureau of Medicine and Surgery. Since that time he has been able to attend to the emergency cases that have arisen among the employés and others, and to attend to the general health of the people on the reservation.

Officers employed at the station on ordnance duty, with their respective duties.

Name and rank.	Duties.
Lieut. N. E. Mason	Inspector of ordnance, in charge of station.
Ensign R. D. Tisdale	Assistant inspector of ordnance, in charge of powder, pressure gauges, etc.; observer at chronograph.
Ensign F. W. Jenkins	Assistant inspector of ordnance, in charge of guns, breech mechanisms, armor plates, cartridge cases, and primers; senior member board of inspection; observer at chronograph.
Ensign M. L. Miller	Assistant inspector of ordnance, in charge of gun mounts, projectiles, fuses, small arms, chronographs, explosion chamber; member board of inspection; supervision of accounts.
Gunner P. C. Hanley	In charge of crane, handling guns and ordnance material; in charge of time book; general supervision of labor around the batteries; member of board of inspection.

Very respectfully, your obedient servant,

N. E. MASON,
Lieut., U. S. Navy, Inspector of Ordnance, in Charge.

The CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

A.

BURNING OF HIGH EXPLOSIVE MAGAZINE.

NAVAL PROVING GROUND,
Indian Head, Md., July 3, 1894.

SIR: I have to report that about 3:45 a. m. Sunday morning, July 1, 1894, the high explosive magazine, with its contents, was entirely destroyed by fire; and I have to forward herewith a report of a board ordered by me, in accordance with article 1720, p. 445, U. S. Navy Regulations, to investigate the cause of the fire; and also to report, as far as possible, on the positions which each of the different high explosives occupied in the magazine, together with the quantity and estimated cost of the material and building destroyed.

This high explosive magazine and the explosives in it have been inspected at least once a week, and oftener when considered necessary, and was last inspected on the forenoon previous to the day of burning. These weekly inspections are always made by an officer, and the one immediately previous to the explosion was made by Ensign Tisdale.

From the position of the door on the ground, about 25 feet in front of the building and with the upper half entirely destroyed, and from the burning of the box of smokeless powder about 75 feet in front of the door, I am of the opinion that the fire was first caused by the partial explosion, or decomposition, of something on the upper shelf; and I think it more than possible that it was caused by the decomposition of the "unknown" explosive mentioned in N. P. G. No. 444, of May 18, 1894, which I am informed in a semiofficial letter from Lieut. Commander Sperry, was ammonite.

As soon as it was found out that the building was hopelessly on fire, the attention of all of the employés present was directed to protecting the main magazine from the heat and sparks, and also to preventing the spread of the fire through the grass and woods.

In my opinion, proper precautions have been taken in regard to the inspection, care, etc., of this building, and the material in it, and the fire could not have been foreseen or prevented.

Very respectfully, your obedient servant,

N. E. MASON,
Lieutenant, U. S. Navy, Inspector of Ordnance, in Charge.

The CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

B.

NAVAL PROVING GROUND,
Indian Head, Md., July 2, 1894.

GENTLEMEN: In accordance with article 1720, p. 445, of the U. S. Navy Regulations, you are hereby appointed a board to investigate the cause of the fire which destroyed the high-explosive magazine Sunday morning, July 1, 1894.

You will also report, as far as possible, on the positions which the different high explosives occupied in the magazine, the quantity and estimated cost of the material destroyed, and also the estimated value of the building.

Respectfully,

N. E. MASON,
Lieutenant, U. S. Navy, Inspector of Ordnance, in Charge.

Ensign R. D. TISDALE, U. S. Navy.
Ensign N. A. MCCULLY, U. S. Navy.
Ensign M. L. MILLER, U. S. Navy.

C.

REPORT OF BOARD OF INVESTIGATION AS TO DESTRUCTION OF HIGH-EXPLOSIVE MAGAZINE.

NAVAL PROVING GROUND,
Indian Head, Md., July 3, 1894.

SIR: In pursuance of your order dated July 2, 1894, and appended hereto, the board met at 1 p. m. the same day and proceeded to inspect what remained of the high-explosive magazine and its contents, and to make inquiries as to its contents and stowage on Saturday, June 30, 1894, and to take the statement of those who heard the explosions and witnessed the fire on Sunday morning, July 1, 1894.

DESCRIPTION OF THE MAGAZINE.

The magazine was a wooden structure, 8 by 10 feet, sheathed and weatherboarded, and ceiled inside. Asbestos paper was placed between the weatherboarding and outside sheathing, also underneath the inside ceiling plank, and there were two thicknesses of the asbestos paper over the top ceiling of the room. There was no ventilation shaft. It was situated at the head of a valley, about 200 feet from the

powder magazine and about 75 feet from the nearest tree. There were two shelves running around three sides of the room, spaced equally vertically. The door was in the center of one side and opened into the magazine.

STOWAGE OF EXPLOSIVES.

The following is a diagram showing the stowage of the magazine when it was destroyed:

THE DISCOVERY OF THE FIRE.

About 3:45 a. m. Sunday morning, July 1, the night watchman, while making his rounds, and distant about 300 yards from the magazine, heard an explosion, followed by two others, a peculiar buzzing noise somewhat like wind, and saw a bright flame in the direction of the high-explosive magazine. The explosions were also heard by some of the mechanics living in a house about 200 yards distant, who immediately proceeded to the fire.

APPEARANCE OF THE FIRE.

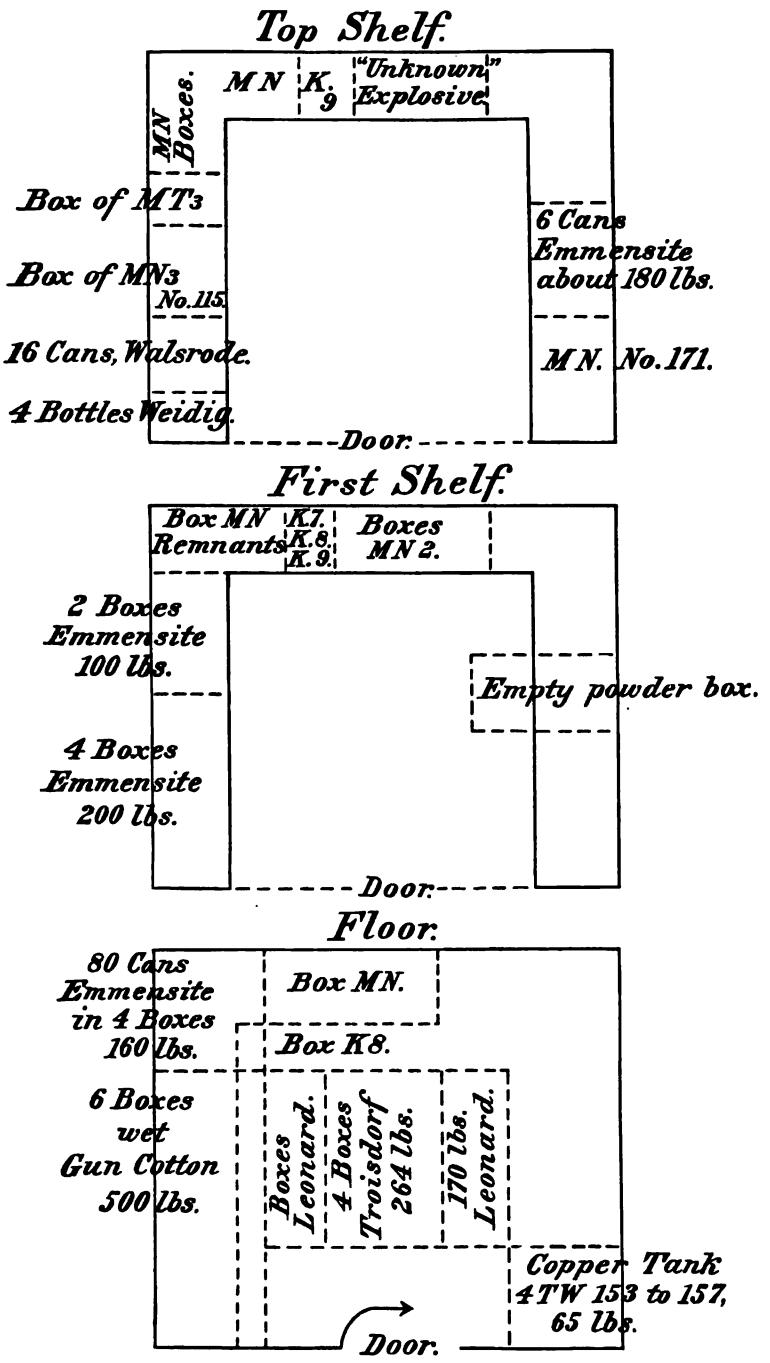
The first one arriving at the fire found the magazine door blown out about 25 yards, flames coming from the open door and around the eaves of the roof, powder in small boxes burning in front of the building, and a considerable quantity of smokeless powder burning in a pile of brush immediately in front of the door and about 100 feet from it, the flames reaching high up into a tree near by. It was also noticed by the light of the fire that the contents of the top shelf had either been blown or burned away, while those of the middle shelf and the floor of the magazine were still there and burning. Soon after this, probably five or ten minutes after the first alarm, four other explosions took place, when the roof fell in, and the flames from smokeless powder shot up in the air, destroying the building and singeing trees to a distance of from 75 to 100 feet, and burning any combustible articles within that radius. The whole fire was over in about an hour.

APPEARANCE AFTER THE FIRE.

After the fire was extinguished the boxes containing the Walsrode powder were found scattered about the front of the magazine, and some where it had stood, all of which were unsoldered and in pieces. The copper tank containing the 4 T smokeless powders was melted up, and seemed to have been blown apart, and was found several feet in front of the building. Several boxes that had been on the top shelf, containing M. N. powder, and also one box that had been on the middle shelf, were recognized and found about 25 feet in front of the building, nearly in line with the door. No trace was found of the metal tubes or the boxes containing the "unknown" explosive situated on the top shelf of the magazine and in rear of the door, nor any of those containing the Troisdorf powder, excepting the screw tops of their metal boxes, which were found about where the building stood. The door, which opened into the magazine, was found about 25 feet in front of the magazine, the inside part down, the top half blown off, excepting the strip holding the hinges, the top hinge broken, and the door wrenched from the left-hand part containing the lock, the latter part being found near by. A broom which had been left in the magazine, standing on top of the boxes containing the Troisdorf powder and reaching to the top shelf in front of the "unknown" explosive, was found directly in front of the door and about 25 feet from it. There was no indication of a detonation or explosion of any high order having taken place. A pasteboard box, which had contained some M. N. powder on the top shelf, was found near the burned pile of brush above referred to, evidently having been blown out there by the force of the explosion.

INSPECTION OF THE MAGAZINE.

The magazine had been inspected every Saturday, the last inspection being on Saturday forenoon, June 30, when a partial inventory had been taken. There were no signs favorable to spontaneous combustion observed; but about 16 pounds of M. N.-3 No. 165 (afterwards placed on the top shelf on the left side, as shown in the above diagram) was found to be turning green and crumbling. A can containing emmensite, also on the top shelf, showed that it had deliquesced to some extent, and some brown liquor had dripped into a box below it containing M. N. powder. The latter, however, was removed, and about 2 pounds which had been dampened by the above liquor was destroyed; the remainder, which was in good condition, was stowed in the middle shelf of the magazine. A tin powder box was placed underneath the above can of emmensite to prevent the spread of any further dripping.


Top Shelf.
MN Boxes.
MN
K. 9
"Unknown" Explosive
Box of MT3
Box of MN3
No. 115.
16 Cans, Walsrode.
4 Bottles Weidig.
6 Cans Emmensite about 180 lbs.
MN. No. 171.
Door.
First Shelf.
Box MN Remnants
K7.
K.8.
K. 9.
Boxes MN 2.
2 Boxes Emmensite 100 lbs.
4 Boxes Emmensite 200 lbs.
Empty powder box.
Door.
Floor.
80 Cans Emmensite in 4 Boxes 160 lbs.
Box MN.
Box K8.
6 Boxes wet Gun Cotton 500 lbs.
Boxes Leonard.
4 Boxes Troisdorf 264 lbs.
170 lbs. Leonard.
Copper Tank 4TW 153 to 157, 65 lbs.
Door.

ORIGIN OF EXPLOSION AND FIRE.

The exact cause of the explosion is unknown, but the following may throw some light on the question: The magazine was exposed to the hot sun, and there was but little air space in it. The temperature for this June has varied during the day between 90° and 120° F. in the sun, and the temperature inside the high-explosive magazine was probably even greater during the middle of the day. On consulting some records of the action of high explosives it would seem that of the contents in the above magazine neither the torpedo-station smokeless powder M. N., K, or 4 T, nor the emmensite nor wet gun cotton were particularly dangerous or liable to spontaneous combustion. The turning green and crumbling of the M. N. smokeless powder has, as far as known, never resulted disastrously; and emmensite generally deliquesces during the warm season without any dangerous results; that having been the case at this station and at Annapolis for some three or four years. The Leonard smokeless powder, containing a large per cent. of nitroglycerine but not exuding, the Walsrode and Troisdorf smokeless powders, though not difficult to detonate by blow, were safe, as far as known. This would leave only the "unknown" explosive, situated on the top shelf, as per diagram, and supposed to be ammoniated, or some ammoniacal mixture put up in lead tubes similar to paint tubes. It is well known that ammonium-nitrate mixtures decompose, especially in hot weather, as witness a number of explosions of "romite" in Stockholm during June, 1887. The board does not assert that the "unknown" explosive was the cause of the fire, but merely suggests that it may have been, from the consideration of its probable character, its position on the top shelf, the condition and position of the magazine door blown out, the position of the broom, the position of the box containing M. N. powder which had been on the top shelf, contents of which were found burning in the pile of brush some 75 feet in front of the building, and that the contents of the top shelf burned out or disappeared first. The door, of course, would yield first, being the weakest part, and there were no signs on any part of the door found of any blow having been received.

CONTENTS OF THE MAGAZINE AND THEIR VALUE.

As far as known, the following were the contents of the magazine on June 30, 1894. Their values are merely estimated, the exact values not being known:

4 T No. 153 to 157, 65 pounds, at $1	$65.00
M. N.-2 (various numbers), 75 pounds, at $1	75.00
M. N.-3 (various numbers), 45 pounds, at $1	45.00
M. N.-6 (various numbers), 100 pounds, at $1	100.00
M. N.-7 (various numbers), 24 pounds, at $1	24.00
M. T.-3, 64 pounds, at $1	64.00
K.-4, 2½ pounds	2.50
K.-7, 8½ pounds	8.50
K.-8 (R. F. guns), 8½ pounds	8.50
K.-8 (4-inch gun), 130 pounds	130.00
K.-9 (R. F. guns), 12 pounds	12.00
Troisdorf No. 29, 264 pounds, at $1	264.00
Walsrode, 80 pounds, at $1	80.00
Weidig, 4 pounds, at $1	4.00
Leonard (4-inch gun), 53 pounds, at $1	53.00
Leonard (5-inch gun), 170 pounds, at $1	170.00
"Unknown" explosive, gross weight (probably ammonite), in lead tubes and boxes, about 300 pounds, at $1	300.00
Emmensite, 640 pounds, at 25 cents	160.00
Wet gun cotton, 500 pounds, at 50 cents	250.00
Total	1,850.50
Value of magazine building	200.00
Grand total	2,015.50

Very respectfully,

R. D. TISDALE,
Ensign, U. S. Navy.
N. A. MCCULLY,
Ensign, U. S. Navy.
M. L. MILLER,
Ensign, U. S. Navy.

The INSPECTOR OF ORDNANCE,
In charge Naval Proving Ground.

No. 5.

SUBMARINE TORPEDO BOATS.

NAVY DEPARTMENT,
Washington, D. C., May 8, 1888.

SIR: In the two designs submitted there are marked differences in size, external form, and method of operation.

The boat shown by the American company is the smaller, being but 85 feet long by 10 feet 9 inches in greatest diameter, and in form is very nearly that of a circular spindle. It is designed to submerge by diving; i. e., by inclining its axis downward, and then applying the propelling power.

The Nordenfelt design shows a boat 125 feet long by 12 feet deep, resembling in appearance the ordinary surface torpedo boat, and is devised for submerging by the operation of down-haul propellers, the boat being always held on an even keel.

The emerging, or returning to the surface after the submergence, is accomplished in the American boat by the propelling power—the axis being inclined upward by the operation of the horizontal rudders—aided by the normal buoyancy of the boat itself; in the Nordenfelt by the normal buoyancy alone, since the down-haul propellers are not designed for lifting.

The motive power in both cases is derived from a steam boiler, fired in the American boat by petroleum and in the Nordenfelt by coal, and in both designs reliance is placed upon the heat contained in the water in boiler to supply power for submerged runs.

In the designs of the two boats, as shown, that of the American provides for pneumatic under and over water guns, while that of the Nordenfelt provides for underwater discharge of Whitehead torpedoes, but in the memoranda accompanying the proposals each designer states that the armament of his boat can be so modified as to discharge both projectile and automobile torpedoes.

In the American design some protection against hostile fire is provided by water in cells by inclined and vertical steel armor, and the boat is compartmented, with regard to being pierced by shot. In the Nordenfelt design these provisions are not made.

These are the salient features that accentuate the chief differences in general design and methods of operation.

A tabulated comparison of the promised qualities and performance is appended hereto.

After considering the conditions under which a submarine boat would probably be useful to the U. S. Navy, the board is of the opinion that the qualities promised for the American boat are more valuable than those for the Nordenfelt, while the chances of obtaining the results anticipated by the designers seem equally probable.

We do not consider it desirable to contract for any submarine boat whose qualities and performance are not strictly guaranteed. If the bidder will enter into a contract based upon detail drawings, exact specifications, and guaranteed performance, to be proved by trial, as required by the Department's circular, we recommend that the award be made to the design of the "Nautilus Torpedo Boat Company."

It is stated in the proposals that four boats of each general type have been built and used by each of the designers, and from experience so obtained results for each design submitted are predicated. In view of the price demanded, we are strongly of the opinion that the qualities

and performance to be guaranteed should equal those which the designers, in their proposals, state that can obtain without difficulty.

We are, sir, very respectfully,

GEORGE A. CONVERSE,
Lieutenant-Commander, U. S. Navy.
W. MAYNARD,
Lieutenant-Commander, U. S. Navy.
W. W. KIMBALL,
Lieutenant, U. S. Navy.

The CHIEF OF THE BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

MEMORANDA.

	American.	Nordenfelt.
Length	85 feet	125 feet.
Diameter	10 feet 9 inch	12 feet.
Displacement:		
Submerged	120 tons	250 tons.
Light	98 tons	160 tons.
Collapsing pressure	300 feet	100 feet.
General form	Approximating a spindle of revolution.	Midship section circular; all other sections lenticular, with cords equal to diameter of midship section; cords placed vertically.
Compartments	Seven principal, separated by 6 water-tight bulkheads.	Four principal, separated by 3 water-tight bulkheads.
Motive power	Steam generated in ordinary type of boiler, using petroleum as fuel.	Steam—coal being used for fuel.
Steam pressure	136 pounds per square inch	150 pounds per square inch.
Engines	Triple exhaustion surface condensing. H. P. 350, revolutions 300 per minute.	Two sets compound surface condensing. H. P. 1,000.
Method of propulsion	Screw propeller, ordinary type, in usual position.	Screw propeller, ordinary type, in usual position.
Fuel endurance	Surface, 360 miles at 15 knots; awash, 346 miles at 14 knots.	Surface, 450 miles at 15 knots; awash, same as submerged.
Power endurance submerged	One-half hour at 14 knots; 2 hours at 8 knots; over 4 hours at 6 knots.	2 hours 40 minutes at 5 knots.
Method of submersion	Diving fins	Down-haul screws.
Reserve buoyancy	Under way, not stated; lying still, virtually nil.	Under way, 2 to 5 cwts.; lying still, same; to be overcome by continued use of down-haul propellers.
Stability	Demonstrated and deemed sufficient.	No data.
Time for renewal of power for submerged runs after total exhaustion.	30 minutes	Not stated; probably 5 hours.
Time for passing from "light" to "awash."	Not stated	25 minutes.
Time for passing from "awash" to submerged.	20 seconds	Instantaneous, because closed up when "awash."
Emersion, when running	Normal buoyancy and fins. From rest submerged by lessening ballast.	Always normal buoyancy, aided by lessening ballast if necessary.
Armament	Aerial and submarine projectile torpedo guns. Latter may be used for automobile torpedoes.	Two automobile torpedo tubes. Pneumatic aerial guns may be used.
Number of shots	12, if all projectiles	5 automobile torpedoes; but 4 are preferred.
Temperature of boat submerged.	80° F. claimed	104° F. stated.
Getting away from obstructions.	Using engines, varying buoyancy, and firing air charges from submarine guns.	Using engines and varying buoyancy.
Protection from fouling by lines, etc.	Depends on smooth exterior of shell and the guards for propellers and rudders.	None stated. Shell of boat is smooth, and propellers can be protected by guards.
Accommodations for crew	Seats and closets proposed	Beds provided.
Preventing too deep a dive	Automatic regulation of fins	Automatic stopping of down-haul propellers; and automatic regulation of fins, if provided.

MEMORANDA—Continued.

	American.	Nordenfelt.
Method of approach when inside of danger spaces.	A series of dives	Series of risings and sinks.
Protection against hostile fire when "awash."	Water, deflecting, and vertical armor. Method of compartmenting claimed as effective.	Relies upon surface boats to draw enemy's fire.
Lookout for commander	One conning tower; houses till nearly flush with shell.	Two fixed cupolas projecting 2 feet. (Note: the bulk of these is measure of normal buoyancy.
Air supply for crew	From compressed-air stores	Depends on volume inclosed in boat.
Test of purity of air	None	By burning candles.
Lighting	Incandescent electric	Candles.
Method of insuring direction when submerged.	Compass and drag	Compass.
Special fittings	Cable cutter for electric cables; device for countermining; camera lucida.	

SUBMARINE BOATS.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., May 17, 1888.

SIR: The Bureau has examined the proposals for the construction of a submarine torpedo boat for the Department, opened May 3, 1888, and has the honor to report as follows:

There were two proposals for constructing this boat—

Cramp Company, Nordenfelt	$175,000
Cramp Company, for Nautilus Company, Holland	135,000

The two proposals differ radically as to the construction of the boat, and also in the proposed modes of operation.

The Nordenfelt is much larger than the Nautilus; she is submerged by means of propellers, whereas the Nautilus is submerged chiefly by the action of diving rudders. The Nordenfelt always must retain reserve buoyancy, whereas the Nautilus creates or parts with it as occasion demands.

The Nordenfelt is also much slower than the Nautilus under water, and it is evident from the tenor of the specifications that she is also more "tender" in a longitudinal sense.

It may be further said that the Nautilus is more completely worked out in the drawings and specifications than the Nordenfelt, and presents many ingenious devices, and has evidently been the subject of much careful thought on the part of her designers.

Boats of both types have been constructed and operated.

The Bureau has carefully examined both of these designs and the descriptions accompanying them, and concludes that the Nordenfelt boat would be deficient in speed and in longitudinal stability, and, being otherwise undesirable, should not be further considered.

The design of the Nautilus Company is preferred, but when the proposal submitted and the price proposed for this design are considered, it is at once seen that acceptance can not be recommended.

The most striking feature of both proposals is the absence of all guarantees of satisfactory performance, it being apparently assumed by the bidders that the Department must be satisfied with correctness of workmanship, and must take the chances in the matter of the boat's successful performance. This position is taken, apparently, on the *score of* the mystery and uncertainty attending the performance of

submarine boats, whereby it can not be known, except by actual trial, what will be the practical performance of any particular functions which may have been the subjects of consideration and calculation.

The Bureau does not agree in these views, and considers it highly inexpedient to entertain any proposal which does not guarantee results.

Many of the points upon which a designer may feel doubtful can be made the subject of reasonable and satisfactory experiment, either in the workshop or in the partly completed boat, and this constitutes an additional reason why the bidders should have guaranteed results. Furthermore, the price is extremely high. The proposal for the Nordenfelt boat states $175,000 as the price, whereas it is believed that a boat of virtually the same size and kind was sold by its English manufacturers to the Turkish Government for about $87,000. The price demanded for the Nautilus boat is on the same exaggerated scale, and in consideration of such a price the bidders ought certainly to have guaranteed results.

I am, sir, your obedient servant,

M. SICARD,
Chief of Bureau.

Hon. WILLIAM C. WHITNEY,
Secretary of the Navy.

BUREAU OF ORDNANCE,
Washington City, May 19, 1888.

SIR: In obedience to your order we have examined the description and drawings of a submarine torpedo boat and propelling mechanism submitted by Mr. George C. Baker.

We find that the description and plans of the boat are not at all full, and it is evident that the designer has not studied out many of the important details pertaining to the successful working of a submarine boat.

The propelling mechanism is the feature most fully elaborated. This contemplates the use of two screw propellers (one on each side), which exert their thrust upon a horizontal shaft passing through the center of gravity of the boat. The shaft revolves in hollow sleeves which are journaled in each side of the boat and communicates its motion by means of miter gears to the propelling shafts, which are right angles to it and revolve in bearings forming a part of the sleeves. The sleeves can be turned 360 degrees in either direction about the horizontal shaft, hence the propellers can be made to act in the direction of any radius of the vertical circles whose centers are in the center of the shaft. With this arrangement the boat can be propelled in any desired direction, held stationary in a submerged position, or turned about. The shape of the boat, a flattened elipsoid (heavily ballasted), and the point of application of the propelling power, give the boat stability and tend to keep its longitudinal axis horizontal when the boat is in motion.

Handiness of maneuvering attained by this mechanism is, however, attended by loss of speed in the boat when under water, owing to the oblique action of the screw necessary to produce and maintain submergence, and also by the advantageous position of the propellers and their attachments, which, projecting as they do from the sides of the boat, are peculiarly liable to fouling and injury. In order to prevent too great a projection the propeller must be of small diameter, and should one propeller be injured the other could not be used.

In view of the facts above mentioned, the board does not recommend any further consideration of Mr. Baker's boat and propelling mechanism.

Very respectfully,

W. MAYNARD,
Lieutenant-Commander.
A. R. COUDEN,
Lieutenant.
C. A. STONE,
Lieutenant.

Commodore M. SICARD,
Chief of Bureau of Ordnance.

BAKER'S SUBMARINE BOAT.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, May 21, 1888.

SIR: Pursuant to the indorsement made by the Department upon the plans and models of a submarine boat presented by Mr. George C. Baker, the Bureau submitted the said plans, etc., to the consideration of a board, composed of Lieut. Commander W. Maynard, U. S. Navy, Lieut. A. R. Couden, U. S. Navy, and Lieut. C. A. Stone, U. S. Navy.

The Department's indorsement required the submission of Mr. Baker's plans to the board which recently examined the proposals for submarine boats, sent in answer to the Department's advertisement of November 26, 1887, and February 27, 1888, but this board having completed its duties, its members had returned to their stations, and as it could not be reassembled without considerable expense, the plans and models were referred to the above-mentioned board, which was considered equally competent for examining them.

The report of the board is inclosed herewith, and it will be perceived that it does not consider Mr. Baker's design or the principle involved in it of sufficient importance to make it advisable for the Department to take any steps at present in regard to procuring a boat of the particular kind advocated by him.

In this opinion the Bureau concurs.

The models and plans are herewith returned.

I am, sir, your obedient servant,

M. SICARD,
Chief of Bureau.

Hon. WILLIAM C. WHITNEY,
Secretary of the Navy.

SUBMARINE TORPEDO BOAT.

BUREAU OF ORDINANCE, NAVY DEPARTMENT,
Washington, March 1, 1889.

SIR: The Bureau has had under considerations the proposals submitted for furnishing a submarine torpedo boat, in response to the Navy Department's advertisement of August 20, 1888, and begs leave to report as follows:

Of the proposals presented the one numbered 3, that of Mr. George

C. Baker, of Des Moines, Iowa, is for building a boat, upon his own design, for the sum of $75,000. He offers no guarantee except for the maneuvering qualities of the vessel; and while his plans show ingenuity and study, they do not, in the opinion of the Bureau, possess sufficient merit, nor are they sufficiently in detail, to warrant the acceptance of his proposal.

The proposal numbered 2, that of Mr. M. P. Hayes, of Hewlett, Va., is incomplete. Mr. Hayes does not propose to build a boat, but merely submits partial plans, which, for a consideration (amount not stated), he will permit the Department to use.

The proposal numbered 1, that of the Columbian Iron Works and Dry Dock Company, of Baltimore, Md., is for building a boat of 131 tons submerged displacement in twelve months from date of contract. This proposal is complete in form and is accompanied by drawings and specifications and descriptions of the proposed vessel in detail.

Three proposals are made in regard to price. First for $150,000; the boat to be guaranteed in all the important features in kind required by the Department's advertisement and circular of August 20, 1888, although some of the qualities guaranteed are less in degree than was contemplated by the Department in its said circular. The second proposal is for $115,000. In this case some of the functions are not guaranteed at all, and some of these are among the most important. Of the others, nearly all are guaranteed in a less degree than was the case in the first proposal. The third proposal is for $100,000. Most of the functions are not guaranteed at all, and some of the most important are guaranteed in so small a degree as to be practically useless. The only points satisfactorily guaranteed in this case are workmanship and material.

After a review of the whole subject, the Bureau is of the opinion that a boat built substantially as set forth in the first proposal of the Columbian Iron Works and Dry Dock Company, of Baltimore, Md., would virtually fulfill most of the requirements of a submarine boat as set forth in the Department's circular above mentioned, and if, when completed, the boat possesses all the qualities and performs as guaranteed in the proposal it would be very useful for offensive and defensive naval warfare.

It is therefore recommended that the first or most fully guaranteed proposal of the Columbian Iron Works and Dry Dock Company, of Baltimore, Md., be accepted, subject to the following conditions:

Further and more detailed drawings of the hull and of all mechanism shall be furnished by the bidder, and certain omissions which now exist in the specifications, and fuller details in certain paragraphs shall be supplied, and certain alterations in nonessential points shall be agreed to—all to the satisfaction of the Department and before the contract is executed; the approval of the Department not, however, carrying with it any responsibility as to results. The contractor to be at liberty to make from time to time, without additional cost to the Department, such changes in the mechanism of the vessel as may appear to him necessary for the better accomplishment of the guaranteed results; such changes not, however, to affect the time of completion as set forth in the proposal, nor the character of the material and workmanship as first class.

The contract to contain all the usual clauses protecting the Department.

Appended to the "proposals" of the Columbian Iron Works and Dry Dock Company is a letter from the firm submitting (in effect) that when the contract is drawn a clause should be inserted providing that the

Department will accept the boat at some reduced price in case she partially fails in any or all of the separate items guaranteed.

In dealing with the question thus far the Bureau has not considered this letter as forming any part of the "proposal." The proposal is properly made out on the official form furnished to the bidder by the Department, and contains no reference to the subject of partial failure or reduced price.

The Bureau considers that the Department should not accept the particular suggestions contained in the letter, but it might be well to state that the contract will provide that in case of rejection, due solely to such partial failure, the question of the advisability of acceptance at a reduced price will be submitted to a board of naval officers, whose conclusions will be subject to the approval of the Department, it being understood that acceptance will be neither recommended nor take place in case of serious failure in any of the more important items guaranteed.

It is thought that the Department should inform the bidder distinctly that the letter in question is not considered as forming part of his proposal.

I am, respectfully, your obedient servant,

MONTGOMERY SICARD,
Chief of Bureau.

Hon. WILLIAM C. WHITNEY,
Secretary of the Navy.

BAKER SUBMARINE BOAT.

[Memorandum for Chief of Bureau of Ordnance.]

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, December 3, 1892.

Trials.—On Saturday, November 26, 1892, a trial of this submarine boat was made in Lake Michigan near the mouth of the Calumet River.

The first attempt to bring the boat to flotation, before submergence, was unsuccessful, as the forward end of the boat was too buoyant. The cause of the trouble was stated to be on account of improper balancing after the removal of the engine and boiler from the after part of the boat and the substitution of storage cells in lieu thereof. Pig-iron ballast was then placed in the forward end of the boat, of a sufficient weight to properly trim the boat with its longitudinal axis parallel with the surface of the water. Water ballast was then admitted and the boat submerged until only the conning dome was visible above the surface. The boat was then closed and started for a totally submerged run in a straight line, by compass course.

Total submergence was successful, but the boat, instead of making a straight course, described almost a complete circle of a diameter estimated at 200 feet. The period of total submergence was 1 minute, 50 seconds. A second run was made with practically the same result.

The course of the boat while under water could be followed by a disturbance of the surface, showing the depth of submergence to be practically uniform throughout the run.

During these runs a leak in the hull of the boat, directly over the switch boards, was developed, and as these electrical appliances were not hooded for protection from moisture they became practically drenched.

After consultation with the members of the torpedo board present, the inventor decided to discontinue the trials on account of danger to the electric system from short circuiting by the moisture at the switch boards.

Since the boat was transferred from Detroit to Chicago the boiler and engine have been removed from the after end of the boat, and the reduction of weight caused thereby has been compensated by storage-battery cells, of which there are 224 now on board. A small electric motor has been installed and connected to a rotary pump by belting for use in pumping and removing water ballast used for submerging.

A compass has been placed as far forward as possible, but being only 15 feet from the main propelling motor it is located within a strong magnetic field and, as shown by the result of the trials, is practically useless as a means for directing the course of the boat.

The inventor claims the following points of power and efficiency for the boat as now fitted:

Speed.—Eight to 9 miles per hour on surface, and only a slight reduction when running totally submerged.

Endurance.—Four hours at full speed.

Possible duration of submergence.—Twenty hours. The board were informed that the boat had been closed for thirty-five minutes with two men inside.

Preservation of boat's longitudinal axis horizontal.—This important feature is the strong principle of the invention, and the claim of the inventor is correct.

The opinion of the board, based upon the trials and an examination of the boat, is as follows:

ON THE PRINCIPLES OF THE INVENTION.

(1) The feature of preserving a horizontal position of the longitudinal axis of the boat while in motion is the true one, and has been successfully accomplished in this boat.

(2) The ability to preserve a practically uniform depth of submergence within practical limits is a necessity, and its possibility has been demonstrated.

(3) The power to quickly submerge, or come to the surface as desired, is shown to be ample and well under control.

(4) The direction of the boat on a straight course, when totally submerged, has not been successful, and the use of the compass as a guide, when located in a strong magnetic field, is not practicable.

ON THE DETAILS.

Many of the appliances are crude and the practical success of the boat would be considerably enhanced if more attention were given to their improvement.

Indicators should be provided to show the position of the helm and the working position of the propellers.

At least two gauges should be provided for indicating the depth of submergence, which should be sufficiently delicate to show slight differences. The means now employed consist of an ordinary dial gauge, which is liable to become clogged, and should not be depended upon for such important service.

All electric circuits, connections, and appliances should be thoroughly protected from danger of excessive moisture or accident from being struck or displaced by persons moving or working in their vicinity.

The tanks for water ballast used in sinking the boat to the point of submergence are properly placed in the bottom of the boat amidships, but a balancing tank should be provided at each end of the boat for giving her the proper trim—each fitted to exhaust its water into the pumping compartment—with valve handles convenient to the person directing the boat's movement and plainly marked to avoid error.

G. A. CONVERSE,
Commander, U. S. Navy, President Torpedo Board.

EMPLOYMENT OF SUBMARINE BOAT FOR PURPOSES OF WARFARE.

[Memorandum for Chief of Bureau of Ordnance.]

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, December 15, 1892.

In the opinion of the torpedo board the examination and trials of the Baker submarine boat, conducted in its presence at Chicago, Ill., on the 26th of November, 1892, satisfactorily demonstrated the practicability of its development as a weapon of warfare.

With a submarine boat, constructed on the Baker principle, and of sufficient power, dimensions, and displacement to permit the installation of a launching tube for automobile torpedoes, or a submarine gun, it would be possible to approach within striking distance of an enemy's ship with greater immunity from danger than by any other known means.

As a base from which to maneuver dirigible torpedoes this type of vessel possesses great advantages, among the most important of which are:

(1) The ability to approach within practical maneuvering distance of an enemy with comparative safety and reduced probability of detection.

(2) The great enlargement of the territory that could be covered by the dirigible torpedo when provided with a movable base, as the limit of that territory would depend solely upon the effective radius of the boat's action.

A combination of the submarine boat, as a base, with a dirigible torpedo like the Patrick or the improved Sims-Edison as the weapon, would afford a very powerful auxiliary for defensive purposes and possess promising features for development as an offensive weapon.

GEORGE A. CONVERSE,
Commander, U. S. Navy, President Torpedo Board.
C. A. BRADBURY,
Lieutenant, U. S. Navy, Member Torpedo Board.

SUBMARINE TORPEDO BOAT.

NAVY DEPARTMENT,
Washington, D. C., June 30, 1893.

SIR: The board appointed by the Department's order of June 22, 1893, for the purpose of examining the designs of a submarine torpedo boat submitted in response to the advertisement of May 1, 1893, has the honor to submit the following report:

The undermentioned designs are not recommeded, being not suffi-

ciently developed to comply with the requirements of the Department's circular:

No. 4, Marcus Ruthenburg; No. 5, Simon Lake; No. 6, Cowles Engineering Company; No. 7, Clarence B. Schultz; No. 8, Jon Ambrose; No. 9, Albert Bosshard; No. 10, O. Brubaker; No. 11, John R. Forbes.

Baker design No. 2.—This design proposes storage batteries as the sole motive power, and the board does not consider such a design advisable in the present state of development of storage batteries.

Baker design No. 1.—This design possesses one feature of great merit, the placing of the propellers on a transverse axis through the center of gravity with a device by which they may be deflected in such a manner as to be used for submergence as well as propulsion. This permits the use of a form of greater longitudinal stability than is practicable in a diving boat, and since, as above noted, the power is applied to a transverse axis through the center of gravity, the maintenance of the longitudinal trim by the exact compensation for weights expended is rendered less important, as far as the depth of submergence and safety are concerned. This compensation is still vitally important, however, since too little causes excessive buoyancy and consequent loss of power in submerging, and too much may destroy the reserve bouyancy and lead to disaster. It is also very desirable that the trim be steadily maintained in order that the torpedo may be properly aimed.

The lack of any detailed description of devices for accomplishing this compensation and other necessary ends, with the exposed position of the propellers and the comparatively small power for surface speed, prevent the board from recommending this design as the best, though it considers it an open question whether submergence by propellers is not a better method than submergence by diving rudders, the reserve buoyancy being the same in each case.

The Holland design.—This design meets every requirement of the Department's circular fairly well, with one exception to be hereafter noted, by mechanical devices described in detail and apparently practicable. The inventor also brings good evidence to support his statement that he has already demonstrated in a smaller boat the practical success of the methods he now proposes.

Although horizontal propellers are introduced in this design for effecting submergence when the boat is not in motion, its important feature is the use of diving rudders to effect and maintain submergence when under way.

The board believes this method to be more speedy and efficient than submergence by propellers, but it has the apparent fault of a greater risk of reaching a dangerous depth. This objection would have greater weight with the board had not the inventor proposed an apparently efficient automatic device for maintaining the longitudinal trim, and had he also not brought good evidence that he has successfully handled a boat constructed on the plan proposed.

The design presented is guaranteed to withstand without undue strains submergence at a depth of 70 feet, which the board considers sufficient. It is of the opinion that the requirement of sufficient strength to endure the pressure due to submergence at 150 feet would so increase the weight of the hull as to render necessary a greater reduction of weight allotted to motive power and other features than is advisable, and recommends that the strength required be that necessary for a continued submergence at a depth of 70 feet, with a reasonable factor of safety. The Nordenfeldt boats were designed for a submergence of 50 feet.

The board considers—

(1) That the design submitted by the John P. Holland Torpedo Boat Company, of New York, most nearly meets the requirements of the Department's circular, and that the guaranty of strength to resist the pressure due to continued submergence at 70 feet will be sufficient.

(2) The board recommends the construction of a submarine boat in accordance with this design, the guaranty of strength being as noted.

(3) The board recommends that the proposal of the John P. Holland Torpedo Boat Company, for the construction of this boat, be accepted.

(4) The test for surface speed should be made a test of endurance as well, and should not be for a smaller period than four hours.

(5) In considering the guaranties submitted with the proposal the board does not believe the system of penalties and premiums set forth to be desirable in connection with the construction of a vessel which is, in a great measure, experimental. It suggests a liberal margin in the qualities of speed, endurance, and facility of maneuvering, within which the boat will be accepted at the full contract price, and outside of which it may be accepted at a considerably reduced price should the Department consider it expedient.

All the designs and proposals submitted to the board are herewith returned.

Very respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy, Senior Member.
P. R. ALGER,
Professor, U. S. Navy, Member.
W. L. CAPPS,
Assistant Constructor, U S. Navy, Member.

The SECRETARY OF THE NAVY.

[First indorsement.]

BUREAU OF ORDNANCE, *July 10, 1893.*

Respectfully forwarded to the Department:

The Bureau recommends that the two bidders, Mr. Baker and Mr. Holland, be called upon by the Department to furnish more detailed descriptions and calculations with reference to the designs which they have submitted.

In those upon which the board now makes a report the two bidders have assumed different degrees of strength for their respective designs; one, Mr. Baker, providing for strength sufficient to withstand a submergence of 150 feet; Mr. Holland, for only a depth of 70 feet.

These differences and the resulting weight of the hull of the two boats makes the two designs incomparable in the matter of speed and other requirements.

The Bureau therefore recommends that Mr. Baker be required to modify his design and description to conform to a necessary strength for a submergence of 70 feet, and that both the bidders be required to assume the same unit of efficiency in the storage batteries which they have proposed to use.

Both of these points are essential, in order that the two systems may be fairly compared.

W. T. SAMPSON,
Chief of Bureau of Ordnance.

TRIAL OF BAKER SUBMARINE BOAT.

BOARD ON SUBMARINE BOATS,
Navy Department, September 8, 1893.

SIR: The board on submarine boats has the honor to report that in obedience to the Department's order of August 24, 1893, it proceeded to Chicago, Ill., in order to witness the trial of the submarine boat of Mr. George C. Baker.

The members of the board arrived in Chicago on August 28, but the lake being rough, on account of the prevailing northerly winds, the trial was postponed by Mr. Baker until the morning of the 31st.

The boat is of the type described in the proposal submitted to the Department, but is crude, and is intended to illustrate only the method of propulsion and submergence, no attempt being made to introduce a torpedo armament or to show automatic devices for maintaining trim or a fixed submergence.

The size of the rudder and the form of the after body are such that good steering is difficult, if not impossible.

The power used is obtained from 220 storage batteries, and is nominally 200 horse-power hours.

There was no means of measuring the horse power developed, and the maximum speed attained, running light, did not exceed 5½ knots.

Two light, vertical rods about 6 feet in length, marked in feet, were secured to the boat, one forward and the other abaft the turret, in order that the depth of submergence and the direction and trim might be observed.

The boat lay in the mouth of the Calumet River, South Chicago, and on the morning of August 31 the board proceeded to that place, the wind being light from ENE., the water smooth, and Mr. Baker having stated that he was ready.

An hour was passed by Mr. Baker in running about in the river making numerous dives of from five to ten seconds' duration, the board observing the experiments from the deck of a tug close at hand.

The depth of water in the river being 19 feet at the most, and the depth of the boat being about 14 feet, no considerable submergence was possible.

Mr. Baker maintained a reserve buoyancy of at least 1,000 pounds during these trials and was reluctant to reduce it to that of the turret alone, afterwards stating that he was cautious for the reason that his boat was so crude an experiment that he was uncertain as to her performance.

Under these conditions the boat, making a speed of about 4 knots, was submerged to a depth of 2 feet over the turret and reappeared in about ten seconds.

In descending, ascending, and while running below the surface the vertical rods showed that a practically constant longitudinal trim was maintained.

At 11:30 Mr. Baker consented to reduce his reserve buoyancy to that of the turret, about 350 pounds in fresh water, closed the boat, and started to go into the open lake for a submerged run of one-quarter of a mile or more.

Immediately after clearing the mouth of the river the boat was submerged for the run, but the starboard screw became disabled, and the boat was towed back. When hoisted out of the water it was found that the cast-iron sleeve fitting over the transverse shaft and carrying the short propeller shaft at a right angle had been broken.

On this occasion, Mr. Baker and his assistant remained closed up in the boat for one hour, with no other air than that free in the boat, without inconvenience or distress.

September 4, the machinery having been repaired and the lake being smooth with a light offshore breeze from SSW., the board embarked on board the tug, and proceeded to a point about 1 mile northeast of the light-house, at the mouth of the Calumet River, where the depth of water was about 30 feet, for the purpose, as before, of making a submerged run of one-quarter of a mile or more.

The boat had, forward of the turret, one vertical iron rod marked in feet to show the depth of submergence, the after one having been removed in order to give a clear wake for the steering device.

In order to enable a straight course to be steered when submerged the following device was arranged: A vertical iron rod passing through the shell of the boat, forward of the turret, carried on its lower end a pointer visible to the steersman. The upper part of this rod, outside of the boat, was bent at a right angle, and to the extremity of this horizontal arm was made fast a cord, dragging about 25 yards astern a light float.

The boat having been run awash on a straight course until the line lay fair in the wake, and the horizontal arm pointed in the same direction, the boat was submerged and it was expected that any deviation from a straight course would be quickly shown by the pointer on the lower end of the rod, enabling the steersman to correct the course.

The reserve buoyancy was reduced to that of the turret, about 350 pounds, and for two hours Mr. Baker endeavored to make the submerged run intended.

The boat descended many times to depths over the turret varying from 1 to 6 feet, the duration of submergence varying from five to seventy seconds, but in no case exceeded the latter period.

During submergence the course of the boat never varied less than 45 degrees, usually about 90 degrees, and at least twice the boat turned through 180 degrees before returning to the surface.

On returning to the surface the boat always had little or no way.

The period of submergence was too short to enable any conclusion to be found from the experiment as to the facility with which a constant depth could be maintained.

On this occasion Mr. Baker and his assistant remained for two hours closed up in the boat without inconvenience, the free air contained in her being the only supply.

The board does not consider that the experiments witnessed afford sufficient ground for the condemnation of Mr. Baker's method of propulsion and submergence inasmuch as in its opinion the failure was principally due to the imperfections of the boat and its mechanism, to the entire lack of any automatic device for maintaining a constant depth of submergence, and to the absence of any efficient device for steering a straight course.

Very respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy.
P. R. ALGER,
Professor, U. S. Navy.
W. L. CAPPS,
Assistant Naval Constructor, U. S. Navy.

The SECRETARY OF THE NAVY,
Navy Department.

SUBMARINE BOATS.

BOARD ON SUBMARINE BOATS,
Navy Department, September 8, 1893.

SIR: The board has the honor to inform the Department that it has carefully reconsidered its report of June 30, 1893, in accordance with the instructions contained in the Department's indorsement of July 12, 1893.

Copies of letters addressed to Mr. George C. Baker and to the John P. Holland Torpedo Boat Company are inclosed herewith.

Mr. Baker conversed informally with the board and explanations were made as to the efficiency of storage batteries. The board also requested information from Mr. Baker as to devices for steering and compensating for weights expended.

From papers submitted by Mr. Baker it appears that by reducing the scantlings of his designs to conform to the new requirements of 70 feet maximum submergence, the available displacement of this design is increased 25 tons, which can be utilized in greatly increasing the motive power and consequently the speed.

It also appears that the Holland design is capable of carrying a much greater weight of machinery or storage batteries by substituting such additional machinery for the ballast specified in the original design.

While the estimates of Messrs. Baker and Holland differ materially as to the weight of storage batteries necessary to obtain a given power, the board believes that this difference of opinion is immaterial in deciding upon the relative merits of the two designs, since there is ample displacement available in each.

Since submitting its original report, the board witnessed experiments with a boat constructed on the Baker principle, but neither these tests nor any additional matter submitted have furnished sufficient cause for altering the conclusion formerly reached, and the board therefore adheres to the recommendations contained in its report of June 30, 1893.

The board has neither taken nor retained any copies of the papers or designs submitted to it, all of which are returned herewith.

Very respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy.
PHILIP R. ALGER,
Professor, U. S. Navy.
W. L. CAPPS,
Assistant Naval Constructor, U. S. Navy.

The SECRETARY OF THE NAVY,
Navy Department.

BOARD ON SUBMARINE BOATS,
NAVY DEPARTMENT,
Washington, D. C., July 14, 1893.

SIR: The Navy Department having returned to the board its report on submarine boats, with certain indorsements calling for more detailed descriptions and calculations, a copy of the above indorsements is herewith inclosed for your information, with the request that you will supply the details called for at your earliest convenience.

The board requests that, concerning the power available for under-

water propulsion, you will state the proposed weight of storage battery per horse power per hour, adding reliable data of actual performance, if obtainable.

Respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy, Senior Member of Board.

Duplicates of this letter were mailed to Mr. George C. Baker and to the Holland Torpedo Boat Company, with copies of the first, second, and third indorsements on the board's report of June 30, 1893.

NAVY DEPARTMENT,
Washington, D. C., February 14, 1894.

SIR: In compliance with the instructions contained in the Department's letter of February 12, 1894, the board designated in that order has to report as follows in relation to the questions propounded in the communication from the House Committee on Naval Affairs:

While the absence of all detail drawings and calculations makes it impossible for the board to make a thorough criticism of the semisubmerged torpedo boat contemplated in the accompanying bill (H. R. 5445), it is of the opinion that it would not form a valuable addition to the Navy inasmuch as it would be a compromise between the ordinary torpedo boat and the submarine torpedo boat, and would be inferior to both in the special qualities which make them efficient as instruments of war. The loss in speed would not be compensated for by the gain in water protection, and the apparent invisibility at night, due to semisubmergence, would be nullified by the actual visibility of the disturbed water, a fact which has recently received practical demonstration.

The impracticability of working the rapid-fire guns when the boat is at its line of deep submergence, and the loss of speed as compared with an ordinary torpedo boat, would render the semisubmerged type an easy victim to the latter with its rapid-fire guns, over-water torpedo tubes, and greater speed.

The incomplete character of the drawings and calculations renders it impossible for the board to give a definite estimate of the cost of construction of such boats as are represented by the accompanying outline designs, but it is of the opinion that an appropriation of $200,000 would be sufficient to cover the cost of construction of a submarine or semisubmerged boat and the necessary experimental work connected therewith, and any such appropriation should cover the cost of experiments as well as construction.

The board is of the opinion that the Department should not be hampered by any provision restricting it to some particular design of submarine or semisubmerged torpedo boat, but that the contract should be awarded after open competition, the merits of the respective competing designs to be passed upon in such manner as the Department may deem best for the interests of the Government.

There is little doubt that an effective submarine torpedo boat would add greatly to the offensive strength of the Navy and would prove a valuable adjunct in the defense of harbors and in operations against blockading fleets. The present state of submarine torpedo boat design is such as to preclude definite predictions as to its ultimate success, but sufficient progress has been made to justify the opinion that money

expended in experimental work of this kind would furnish reliable data and probably lead to a successful issue.

A copy of the order convening the board, and the original papers and blue prints accompanying the same, are herewith returned.

Very respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy, Senior Member.
F. F. FLETCHER,
Lieutenant, U. S. Navy, Member.
W. L. CAPPS,
Assistant Naval Constructor, U. S. Navy, Member.

The SECRETARY OF THE NAVY.

DEPARTMENT OF THE NAVY,
BUREAU OF NAVIGATION,
Washington, D. C., February 12, 1894.

SIR: A board, consisting of yourself as senior member, and Lieut. Frank F. Fletcher, U. S. Navy, and Assistant Naval Constructor Washington L. Capps, U. S. Navy, as members, is hereby appointed, to meet at the Navy Department, Washington, D. C., at 10 a. m. on the 13th instant, to consider the question in regard to a proposed submarine torpedo boat submitted in a letter received from the Committee on Naval Affairs, House of Representatives, under date of February 9, 1894, a copy of which will be furnished by the Chief of the Bureau of Ordnance.

You will assemble the board at the place and time specified, the members of which have been directed to report to you.

This duty is in addition to your present duties.

Very respectfully,

F. M. RAMSAY,
Chief of Bureau.

Lieut. Commander CHARLES S. SPERRY, U. S. Navy,
Bureau of Ordnance, Navy Department, Washington, D. C.

NAVY DEPARTMENT,
Washington, D. C., March 17, 1894.

SIR: In obedience to instructions contained in the Department's letter of the 28th ultimo, the board appointed under order of February 12, 1894, reconvened at 10 a. m., March 15, 1894, and considered additional written and oral evidence on the subject of a proposed semisubmerged torpedo boat submitted by the John P. Holland Torpedo Boat Company.

This additional written evidence consisted of a more detailed statement of the advantages claimed for this type of vessel and calculations intended to show the practicability of attaining with a semisubmerged boat, at light draft, a speed equal to the designed speed of the *Ericsson*.

Mr. Holland claims that, at light draft, on a displacement of 346 tons, this boat will attain a speed of 24 knots when the engines are developing 4,000 indicated horse power. The reasoning by which Mr. Holland arrives at this result is subject to serious criticism, since it is

not in keeping with generally accepted theories of the resistance of ships.

The above estimate of speed, Mr. Holland stated, was based on the supposition that the *Ericsson* would make 24 knots on 1,800 horse power, but aside from other sources of error, he failed to take into consideration the fact that the two vessels are not at all similar, the *Ericsson's* coefficient of fineness being 0.38, while that of the proposed boat is 0.58, a coefficient of fineness not usually adopted for any but low-speed vessels.

In estimating the power necessary to be developed to attain a speed of 22.5 knots when the vessel was at its load draft, no account was taken of the weight of water contained in the partially open superstructure, although it is quite apparent that this mass of water, amounting to nearly 70 tons, will be carried along with the boat.

The proposed design can finally be reduced to two types of protected surface torpedo boat. In the light condition this protection is confined to the helmsman and officer directing the movements of the boat, the other portions of the vessel being as vulnerable as the ordinary torpedo boat, but even this protection is obtained at the expense of carrying 81 tons of dead-weight ballast on a total displacement of 346 tons. In the load condition an additional protection of 3 feet of water is obtained, but at an expenditure of 162 tons of dead-weight ballast and 67 tons of dead water carried in the superstructure, making a total of 229 tons useless weight on a vessel of only 495 tons displacement. Such a disposition of weights is hardly justifiable, even when giving greatest consideration to the water protection thereby obtained.

When it is considered that recent torpedo-boat destroyers have attained a speed of 28 knots on a displacement of only 220 tons it would seem that the partial protection obtained for the semisubmerging type has been acquired at too great a sacrifice, inasmuch as a speedier and more seaworthy boat could be designed on the same displacement with steel-armored deck and conning tower, cellulose belts, and extensive subdivision of hull.

Such a vessel as that indicated in the preceding paragraph, however, would be nothing more or less than an armored torpedo boat, and up to the present time such a vessel has not been considered desirable, as the principal function of the torpedo boat is to fight under cover of darkness, and speed has been considered more valuable than armored protection.

In conclusion, the board is of the opinion that, while an efficient submarine boat would undoubtedly form a valuable addition to the fighting strength of the Navy, a semisubmerging vessel as that proposed by the John P. Holland Torpedo Boat Company is not desirable.

The board returns herewith the papers and plans submitted for its consideration, and has attached to this report copies of all orders and letters in relation thereto.

Very respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy, Senior Member.
F. F. FLETCHER,
Lieutenant, U. S. Navy, Member.
W. L. CAPPS,
Assistant Naval Constructor, U. S. Navy, Member.

The SECRETARY OF THE NAVY.

NAVY DEPARTMENT,
Washington, February 28, 1894.

SIR: I have the honor to inform you that the Department has this day notified Mr. John P. Holland that it would grant his request for a further hearing before the board of which you are a senior member, with the understanding that any statements as to speed or other qualities which he may make be supported by calculations given in detail, so that they can be properly verified, and the board is hereby ordered to reconvene for the purpose indicated, and you will notify Mr. John P. Holland of the date of the meeting of said board.

Very respectfully,

H. A. HERBERT,
Secretary of the Navy.

Lieut. Commander CHARLES S. SPERRY, U. S. Navy,
Senior Member of Board on Submarine Boats, Navy Department.

DEPARTMENT OF THE NAVY,
BUREAU OF ORDNANCE,
Washington, D. C., February 28, 1894.

SIRS: By direction of the Navy Department, the board on submarine boats will reconvene for the purpose of giving a further hearing to Mr. John P. Holland.

The board requests to be informed when Mr. Holland's statement is ready, in order that a time may be set for meeting.

Respectfully,

C. S. SPERRY,
Lieut. Commander, U. S. Navy, Senior Member of Board.

The JOHN P. HOLLAND TORPEDO BOAT COMPANY,
120 Broadway, New York, N. Y.

THE JOHN P. HOLLAND TORPEDO BOAT COMPANY,
120 Broadway, New York, March 1, 1894.

SIR: We are in receipt of your letter of the 28th instant. We will inform you when Mr. Holland's statement is completed.

Yours, truly,

THE JOHN P. HOLLAND TORPEDO BOAT COMPANY,
Per ELIHU B. FROST,
President.

Lieut. Commander C. S. SPERRY, U. S. Navy,
Board on Submarine Boats,
Navy Department, Washington, D. C.

No. 6.

TRIAL OF 6-POUNDER RAPID-FIRE GUNS.

APPOINTMENT OF BOARD.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, October 10, 1893.

GENTLEMEN: You are appointed a board to make a comparison of the Driggs-Schroeder, Hotchkiss, and Sponsel rapid-fire guns; the test to be limited to the strength of gun, and especially of the breech mechanism and to the convenience of arrangement of breech mechanism and its handiness and certainty in working.

Please compare the weights of the guns, and the distribution of the weights in the different parts of each gun. You will subject the guns to firing with service charges, with defective ammunition, and to firing with charges giving pressures up to 20 tons, if practicable, and necessary to enable the board to reach a conclusion.

Respectfully,

W. T. SAMPSON,
Chief of Bureau of Ordnance.

Lieut. Commander C. S. SPERRY, U. S. Navy.
Lieut. Commander A. R. COUDEN, U. S. Navy.
Lieut. N. E. MASON, U. S. Navy.
Prof. P. R. ALGER, U. S. Navy.

REPORT OF BOARD.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., November 10, 1893.

SIR: The board appointed by your order of the 10th of October, 1893, copy of which is appended, for the trial of the Hotchkiss, Driggs-Schroeder, and Sponsel 6-pounder rapid-fire guns has the honor to report as follows:

The trials took place at the Naval Ordnance Proving Ground, Indian Head, Maryland, on the 1st, 2d, and 3d of November, 1893. The representatives of the Sponsel and Driggs-Schroeder companies were present on all three days. Mr. Sponsel and an expert mechanic, in the interest of the Driggs-Schroeder Company, were also in attendance. The representative of the Hotchkiss Company was present on the first day only, and no expert was present in its interest.

The guns were all served by a crew of four men belonging to the proving ground, the representatives of each company being afforded an opportunity to explain the manipulation of the mechanism before operations were commenced.

The guns used were the Sponsel gun, belonging to the company, and the Hotchkiss 6-pounder, No. 44, and Driggs-Schroeder, No. 75, belonging to the Government.

The Hotchkiss and Driggs-Schroeder companies each submitted breech blocks and mechanisms of a new design, which replaced the service blocks in the guns used.

After an inspection of the mechanism by the board, the trial was taken up as follows:

Ten service rounds were fired slowly from each gun to observe the

action of the mechanism. This test was satisfactroy with all three guns.

Ten service rounds were fired at the butt from each gun, as rapidly as the smoke would permit, in order to note the facility of loading and aiming.

The crank handle of the Driggs-Schroeder gun is on the left of the gun and the sight and shoulder piece on the right.

The loader stands at the left, entirely clear of the line of sight, and after placing the charge in the gun closes the breech himself, which he can do with ease, owing to the lightness of the block.

The housing of this gun being closed over the top of the block, there is some chance that the loader's hand may be caught by the upward swing of the block in closing. This disadvantage is obviated by the fact that the loader himself closes the breech.

It is not necessary to set the cartridge as close home by hand before closing the breech as with the other two guns, but the closed housing concealing the chamber more care is necessary in inserting.

Two men performed the operations of loading, aiming, and firing with ease and rapidity.

The Hotchkiss gun has the shoulder piece on the left side, the sight and crank on the right side. The man closing the breech does not interfere with the line of sight. The loader stands on the left.

Three men were necessary to perform the operations of loading, aiming, and firing.

The Sponsel gun has the shoulder piece on the left, the sight on the right, and the crank moves in a plane perpendicular to the axis of the gun.

Three men were necessary to perform the operations of loading, aiming, and firing, the loader standing on the left and the man closing the breech on the right. The crank handle moves through a semicircle in a plane perpendicular to the axis of the gun.

As the crank handle is thrown up in closing the breech, the man's hand passes about 2 inches below the line of sight.

For rapid firing at a moving target it is necessary to keep the gun on the target as nearly as possible during the operation of loading, but the effort necessary to raise the block causes the breech to be thrown forcibly first to one side and then to the other at the instant the loading is completed and the gun captain is endeavoring to correct his aim. The effect is all the greater, owing to the leverage due to the distance from the face of the breech to the center of the pivot, and is met by the gun captain in the direction of his least stability.

The thrust of the crank handle of the other two guns, being in a plane parallel to the axis of the gun, does not tend to lateral deviation, and the effect of the deviation is slight, the leverage being less and the disturbance being met by the resistance of the gun captain's shoulder firmly braced against the shoulder piece.

Owing to the little effort required to close the Driggs block, the derangement of the air is less than with the Hotchkiss.

Fired ten rounds without aim as a test of rapidity, the guns being loaded at the start.

For the Hotchkiss, time, 33.6 seconds. One missfire on the sixth round. Fired on the second pull. For the Driggs-Schroeder, time, 27 seconds. For the Sponsel, time, 32.5 seconds. There were several failures to cock, owing to the gun captain having kept a slight strain on the lanyard, the effect being that the sear did not engage and the case let the firing pin down easily without firing.

The housing being open over the blocks of the Hotchkiss and Sponsel guns, the cartridge is entered with great facility and the hand can not be caught.

Fire, dismount, reassemble and fire, noting time from fire to fire The Hotchkiss, time, 1 minute 17.4 seconds. The Driggs, time, 1 minute 56 seconds. The Sponsel, time, 2 minutes 22 seconds.

Fire, change firing pin and fire, noting time from fire to fire: Th Hotchkiss, time, 1 minute 32 seconds; 1 minute 5.8 seconds. Th Driggs, time, 1 minute 53.6 seconds; 2 minutes 6 seconds. The Spo sel, time, 3 minutes 1.2 seconds; 2 minutes 4 seconds.

Fire, replace one extractor and fire, noting time from fire to fir The Hotchkiss, time, 12.4 seconds. The Driggs, time, 3 minutes 9 se onds. Part of the delay in this operation with the Driggs was caus by accidentally shoving the crank shaft back while attempting to sh the crank lever after the locking spring had been put in place. Th jammed the spring in the crank-shaft journal. The Sponsel, time, seconds.

Defective ammunition.—Five cartridges were prepared for each g by turning down the primer caps until they were about 0.005 in thick. The defective rounds were alternated with good.

The Hotchkiss: Five defective rounds were fired, the primer blo ing back each time, and four good rounds, alternating, without del or failure. Upon dismounting much dirt was found in the mechanis but no injury excepting a slight upsetting of the firing pin.

Defective ammunition—Blow backs.—The primer cap is made so th that the force of the explosion blows it out, allowing the gas, resid and small pieces of the primer to be driven into the mechanism wi great force. It is an accident which might happen with bad amm nition.

The Driggs: First blow back blew out primer cap. Head of case f off when the breech was opened. Broke firing pin, but mechanism o erwise uninjured. The indications were that the temper of the firi pin was too high, as another had previously been broken by acciden snapping. No more firing pins were on hand at the proving grou and the trial was suspended for the time being.

The mechanism having been changed, and a new firing pin of a low temper having been procured and put in place, four more blow bac alternating with good rounds were fired. After each blow back t firing pin stuck and would not go home. It was readily cleared so to fire properly by holding back the sear and then setting the firi bolt home by tapping on its head. This operation being repeated few times, cleared the bolt without dismounting the mechanism, but t difficulty increased with each fire. Upon dismounting, the mechanis was found to be very dirty but uninjured, except a very slight ups ting of the firing pin.

The Sponsel: First blow back: Fired and loaded with a good roun missed fire; dismounted, cleaned mechanism, and reloaded; missed f three times. Loaded with another cartridge; missed fire twice; fir on third trial.

Second blow back: Fired, loaded with good round; missed fire; firi pin stuck; dismounted and found firing bolt much clogged with re due; occupied some minutes in cleaning, replaced, and fired a go round after one missfire.

Third blow back: Fired, loaded with good round; missed fire; fired second trial.

Fourth blow back: Fired and loaded with good round; firing p

stuck; broke lanyard on second pull; dismounted, cleaned firing bolt, and filed out burr caused by gas-scoring in seat of firing bolt, which prevented its going home. Found the end of sear broken off, but this did not affect the working of the mechanism. It would cause slight inconvenience in dismounting only. Fired a good round.

Fifth blow back: Firing pin stuck hard; dismounted and cleaned mechanism, which was very foul. No other injuries than noted.

Excessive pressures.—From each gun were fired one round for 16 tons pressure, two rounds for 18 tons, and four rounds for 20 tons. The charges necessary were previously determined by experiment and were as follows:

Sixteen tons, 400 grams Schagticoke shell, bottom of case; 280 grams Schagticoke rifle, top of case. Eighteen tons, 400 grams Schagticoke shell, bottom of case; 300 grams Schagticoke rifle, top of case. Twenty tons, 400 grams Schagticoke shell, bottom of case; 325 grams Schagticoke rifle, top of case.

No pressure gauges were used in the guns under trial, as in blowing out with excessive pressures they may cause serious injury to the bore.

All the guns are gauged about the housing before and after the firing.

The firing was done by all the guns without failure, accident, or jamming of the block, and the gauge showed no change of dimensions after firing.

Test of extractors.—A case loaded with sand and an empty shell was thickly covered with rosin to such an extent that it could not be set home with the hand within less than 1¼ inches. It was then forced home in each gun by repeated blows from the mechanism and a mallet.

None of the three mechanisms had sufficient power to withdraw the cartridge.

The leverage of the Hotchkiss crank handle was increased by slipping over it a piece of gas pipe.

After repeated effort, the head of the case started and the cartridge was backed out from the muzzle.

The lip of the extractor was somewhat bent and a slight burr was raised on the upper edge of the extractor slot.

The Sponsel gun could not extract and the cartridge was backed out. The mechanism was entirely uninjured. This gun has two extractors, somewhat similar to that of the Hotchkiss, but they are housed in the block while the extractor stud engages in a slot in the side of the breech mortise. The consequence of this arrangement is that as the block drops, carrying the extractors with it, their sharp lips move downward and to the rear in a slanting direction and score the flange on the head of the case.

The Driggs gun: In endeavoring to extract, after repeated trials, using all the force that could be applied to the crank handle, the left extractor broke near its pivot. The mechanism was otherwise uninjured and the remaining extractor enabled the gun to be worked. The block was removed before backing out the cartridges, which is always possible with this mechanism when the extractors are jammed.

The trial of the guns was concluded. The weight of the breech block, with the mechanism and crank handle, was found to be as follows:

	Pounds.
Driggs-Schroeder	35¼
Sponsel	59¼
Hotchkiss	67¼

In simplicity the mechanisms do not differ materially, and other things being equal, the less the weight of the mechanism the better. In this respect the Driggs-Schroeder is much superior to the other two.

Broken extractors may be replaced in the Hotchkiss and Sponsel guns without removing the block, and in this they are superior to the Driggs-Schroeder.

The mechanism of the Hotchkiss is not as readily clogged by residue as that of the other guns, and is less liable to be affected in its action by hard usage or ordinary wear than that of the Driggs-Schroeder.

For the purpose of comparing the effect of the type of breech mechanism upon the weight of the after portion of the gun, the weight of that part in rear of a section 5 inches forward of the face of the tube, and its ratio to the total weight of the gun were computed, the block and mechanism being in place. The result was found to be for the Hotchkiss 36 per cent, and for the Driggs-Schroeder 25 per cent.

A drawing from which to make the same computation for its gun could not be obtained from the Sponsel Company, but the form and weight of the rear portion of that gun differ very slightly from the Hotchkiss.

The weight of the guns being equal, the less the metal necessary to house the breech mechanism securely the greater the amount available for increasing the length or strength of the chase. In this respect the Driggs-Schroeder is superior to the others.

The board places the guns tried, in their order of merit, as follows: First, the Hotchkiss; second, the Driggs-Schroeder; third, the Sponsel. The difference in favor of the Hotchkiss, as compared to the Driggs-Schroeder, is slight, but the inferiority of the Sponsel to both the others, particularly in the interference of the operation of loading with the aiming of the gun, is marked.

The introduction of different types of rapid-fire guns into the service has very grave disadvantages.

Guns being of the same system, and their parts interchangeable, may all be maintained ready for action, even though a sufficient number of parts have been broken to disable several guns, were they of different types. Breakage is more or less frequent with all rapid-fire guns, and the parts are so difficult of manufacture that they can rarely be replaced except by the makers.

Nothing but marked superiority can justify the introduction of a new type of gun if others of the same class are already in service.

Respectfully,

C. S. SPERRY,
Lieutenant Commander, U. S. Navy.
N. E. MASON,
Lieutenant, U. S. Navy.
PHILIP R. ALGER,
Professor, U. S. Navy.

MINORITY REPORT.

I am unable to agree with the other members of the board regarding the order of merit in which the guns are placed, as set forth in the preceding report.

The Driggs-Schroeder should be placed first, in my opinion, for the following reasons:

First. It is handier in use, as shown by more rapid loading and firing, and this by a crew familiar with loading, firing, and handling the *Hotchkiss gun* and unfamiliar with the Driggs-Schroeder.

Second. One less man is required for working the gun; that is, 3 men are required instead of 4. This is important, in crowded spaces especially.

Third. The power required to manipulate the Hotchkiss gun is very fatiguing after a few rounds, and the rate of firing will inevitably decrease. On the other hand, very little power is required with the Driggs Schroeder, and the rate can be maintained for a long time without sensible fatigue.

Fourth. The Driggs-Schroeder is more easily kept on a target, because the jar due to the movement of the block is scarcely apparent, while it is marked and troublesome in the Hotchkiss gun on opening and closing the breech.

Fifth. The lightness of the breech enables a better distribution of the weight for safety in use. This is shown practically by the guns actually tried.

Sixth. The number of working parts is considerably fewer than in either of the other guns, the action more direct, and the mechanism simpler.

These points cover the essentials of a rapid-fire gun, and the order of merit should, in my opinion, be: First, the Driggs-Schroeder gun; second, the Hotchkiss gun; third, the Sponsel gun.

The statement which asserted that the Hotchkiss gun will probably stand the incidents of service better than the Driggs-Schroeder is, in my opinion, unwarranted by any facts within the knowledge of the board. Such information as is available leads me to the opposite conclusion.

In other points I agree with the report of the board.

Respectfully,

A. R. COUDEN,
Lieutenant Commander, U. S. Navy.

The CHIEF OF THE BUREAU OF ORDNANCE.

[First indorsement.]

BUREAU OF ORDNANCE, *November 11, 1893.*

Respectfully forwarded to the honorable Secretary of the Navy.

The Bureau concurs in the conclusions reached by the board, without expressing an opinion as to the relative merits of the Driggs-Schroeder and Hotchkiss guns.

The Sponsel gun was found to be sufficiently strong. Some of the defects developed in this gun can probably be removed, but the disturbance of the aim caused by the motion on the lever actuating the breech mechanism can not be removed, and constitutes a serious objection.

Aside from all other considerations, however, the Bureau does not think it wise to add to the number of types of small guns in the service.

W. T. SAMPSON,
Chief of Bureau of Ordnance.

[Second indorsement.]

NAVY DEPARTMENT. *November 11, 1893.*

Returned to the Bureau of Ordnance.

The majority report of the board is approved.

H. A. HERBERT,
Secretary of the Navy.

No. 7.

MAJORITY REPORT OF THE BOARD FOR THE TRIAL OF MACHINE GUNS.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., August 4, 1894.

SIR: In accordance with the order contained in the Bureau's No. 4272, dated July 5, 1894, the board for the trial of machine guns met on July 6 and continued in session until this day, adjourning from time to time, as necessary.

The general programme outlined in the Department's circular, dated March 22, 1894, was followed, and in addition such tests as the board deemed desirable.

Six guns were submitted for trial, namely: Gatling, Accles, Gardner, Robertson, Maxim-Nordenfelt, and Skoda. Of these the first four are actuated by hand cranks, and the guns are of the multibarrel system; the last two are automatic and single barreled. Their main characteristics will be found in the appended table and in the record of proceedings.

The Robertson gun was withdrawn permanently during the progress of test 8, and the Gatling and Accles were both withdrawn temporarily.

The tests were made at the Washington navy-yard and the naval proving ground, as found desirable, and the order on the programme adhered to as nearly as possible. A range of 25 yards only could be obtained at the navy-yard, but this was found sufficient for the purpose of the tests made there.

The submittal of an improved charger by the representatives of the Accles gun is referred to in the record and the characteristics given in the table.

Appendices and exhibits as follows accompany the report:

A.—Order convening board.
B.—Circular.
C.—Programme of tests.
D.—Record of proceedings.
E.—Table of weights, etc.
F.—Letter from chief of Bureau authorizing withdrawal of Gatling and Accles guns.
G.—Letter from chief of Bureau indorsing the letter of the Driggs Company for withdrawal.
H.—Letter from Mr. Robertson withdrawing gun permanently.
I.—Letter from proving ground giving velocities.
J.—Letter from the Driggs Company submitting new design of feed.
K.—Information concerning Maxim ammunition.
Exhibits of cartridges that caused interruptions.
Exhibits of cartridges as they came from the supply chest.
Exhibits of chargers of Gatling, Accles, and Robertson guns.
Exhibits of sectional cartridge cases, showing thickness, etc.
Tracings of targets at 25 yards.
Photographs of targets at 1,000 and 500 yards.
Photographs of guns.

To determine the order of merit of the guns submitted under the conditions of the actual tests by the board, each gun was considered with regard to its merit under the eight following headings:

(1) Certainty of fire (ammunition supposed to be efficient).

(2) Simplicity of mechanism and its liability to get out of order in service.

(3) Accuracy and facility of aimed fire.

(4) Rate of fire.

(5) Weight of gun.

(6) Method of feed and ammunition supply.
(7) Ease and convenience of manipulation.
(8) Crew required.

The relative value of the above features, then, having been determined upon, the final order of merit is considered to be as follows: Maxim-Nordenfelt, Gatling, Accles, Skoda, Robertson, and Gardner.

Taking up the guns in the inverse order of merit, as above determined, advantages and disadvantages of the various systems are as follows:

GARDNER.

DISADVANTAGES.

1. Low speed of fire in proportion to weight.
2. Great derangement of aim by the effort on the crank and its location.
3. Liability to damage through hang fires.
4. Gravity feed and frequent jams of feed.
5. Insufficient power of extraction and play of extractor permitting slipping off rim of cartridge, causing failure to extract, and the loss of several unfired cartridges each time the gun is cleared.
6. Intermittent fire.
7. Unserviceable character of charger, due to instability and liability to damage from weather and transportation.
8. Number of men required in crew.

ADVANTAGES.

1. Simplicity of mechanism.
2. Comparatively light weight.

ROBERTSON.

DISADVANTAGES.

1. Insufficient support of cartridge at the chamber, due to the design of feed wheel and belt, causing ruptured cases and jams.
2. Derangement of aim by crank effort.
3. Liability of feed belt to jam through bending or displacement of links.
4. Lack of facility of stowage of ammunition due to design of feed belt.
5. Liability to damage by hang fires.

ADVANTAGES.

1. Lightness and consequent mobility.
2. Shock of recoil not communicated to mechanism, but taken on frame.
3. Simplicity of mechanism.

SKODA.

DISADVANTAGES.

1. Gravity feed, and consequent interruptions, jams, and liability to premature explosions.

2. Failure to work automatically unless the cartridges and chamber are lubricated.
3. Complexity of mechanism.
4. Small range of mechanism.
5. Slight derangement of aim, due to pressure required to overcome spring on charger in feeding.
6. Weight and cumbersome character of chargers.
7. Liability to temporary inaction from damage to single barrel.
8. Impracticable cooling device for barrel.

ADVANTAGES.

1. Lightness and consequent mobility.
2. Freedom from damage due to hang-fires.
3. Great directive facility, due to absence of disturbing influence of crank effort.
4. Two men only required in crew.

ACCLES.

DISADVANTAGES.

1. Great weight, making the gun inconvenient for boat or landing purposes.
2. Derangement of aim by pressure required on charger to overcome spring of lever which throws feed mechanism in action.
3. Liability to damage by hang-fires.
4. Very small actual volume of fire in proportion to number of barrels and weight, due to gearing down of crank at trunnions, crank effort, and intermittent character of fire.
5. Complicated, heavy, and cumbersome feed mechanism, and its liability to jam by loose cartridges, and also the time, effort, and skill required to clear.
6. Unsuitability for service use of chargers, for the reason that if the charger becomes bent or wet its rigidity is destroyed and the cartridges lost through inability to use in the gun.
7. Intermittent fire, and large intervals between the fire of chargers.
8. Number of men required in the crew.

ADVANTAGES.

1. Capability of use with any number of barrels less than full number in case of damage to barrel or lock, but with the probability of a jam if fired at depression under these circumstances.
2. Adaptability to motor power.
3. Familiarity of the service with this type of mechanism.

GATLING.

DISADVANTAGES.

1. Great weight, making the gun inconvenient for boat or landing purposes.
2. Great derangement of aim by the effort on the crank and the location of the latter.
3. Liability to damage by hang-fires.
4. Small actual volume of fire in proportion to number of barrels and weight, due to crank effort and intermittent character of fire.

5. Liability of cartridges in feed strip being displaced, causing a jam.
6. Intermittent fire.
7. Number of men required in crew.

ADVANTAGES.

1. Simplicity of charger and hopper, making the clearing of jams easy and rapid.
2. Capability of use with any number of barrels less than the full number in case of disabling lock or barrel, but with a probability of jam if fired with depression under these circumstances.
3. Familiarity of the service with this type of mechanism.
4. Adaptability to motor power.

MAXIM.

DISADVANTAGES.

1. Complexity of mechanism.
2. Liability to temporary inaction due to damage to single barrel.
3. Necessity of renewal of water supply in jacket after continuous firing of about 2,000 rounds, and from leakage.

ADVANTAGES.

1. Lightness and consequent mobility.
2. Freedom from damage due to hang-fires.
3. Great directive facility due to absence of crank effort.
4. Small crew required.
5. Continuity of fire.
6. Facility of packing and stability of cartridges due to design of feed belt.

After careful consideration the board is led to the conclusion that the efficiency of an automatic machine gun is necessarily so much greater than that of any gun worked by hand that nothing but a strong presumption that the latter will not remain efficient under the rough usage and exposure incident to service can justify the adoption of the inferior but less complicated gun.

In arriving at this conclusion due weight has been given to the advantages of multi-barreled systems, and to the unfavorable effect of unsatisfactory ammunition upon all the guns in the tests. Due regard was also paid to the consideration that the mechanism of an automatic gun necessarily requires greater care and skill for its continued efficient use than is the case with most hand-worked guns, but the board is of opinion that too much would be sacrificed to a fear of lack of skill if the great advantages of the automatic system were put aside.

The Maxim-Nordenfelt gun not only proved itself greatly superior to all the others submitted, but the only hitches of any kind during the entire trial were such as may be fairly attributed to defects in the ammunition or such defects in the gun as are found in all guns and which are remediable. Moreover, this gun has been used in several services since 1888, and less than two years ago was officially adopted by the German navy.

The different uses to which machine guns must be adapted led the board to consider the advisability of adopting two systems—one for special use on board ship, the other for landing purposes, but the increase in volume of fire of the Gatling and Accles guns over the

Maxim-Nordenfelt proved so slight that the simplicity due to the use of a single gun appeared to offer the greatest advantage.

The board, therefore, recommends the adoption of the Maxim-Nordenfelt gun and that all machine guns for the naval service be of this type, contingent upon the successful test of a gun of 6 mm. caliber.

Very respectfully,

PHILIP R. ALGER,
Professor, U. S. Navy.
A. C. DIEFFENBACH,
Ensign, U. S. Navy.

To CHIEF OF THE BUREAU OF ORDNANCE.

MINORITY REPORT OF THE BOARD FOR THE TRIAL OF MACHINE GUNS.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., August 4, 1894.

SIR: I dissent from the report of the majority of the board recommending the Maxim-Nordenfelt gun as best adapted for use in the naval service.

The guns submitted are of two classes:

First. Those requiring either hand or motor power to perform the operations of loading, firing, and extracting.

Second. Automatic guns utilizing force generated by the explosion of the charge to continue the operations of loading, firing, and extracting after the first round has been fired by hand.

The facility of aiming is much greater with guns of the second class than with those of the first, since the operating force has little effect upon the aim being automatically exerted in the direction of the line of fire, and there is no one at the crank in a position to interfere with sighting.

Guns of the automatic class also have the advantage of lightness and small crews and the mechanism being necessarily at rest until the explosion of the charge, no accident can occur from hang-fires.

The superiority of automatic guns as compared to those of the other class is a question of certainty of action.

I agree with the majority of the board in placing the Gatling first among guns of its class.

When the trial of the Gatling commenced it was found that the tin charger strips were defective, causing jams.

This fault having been remedied, the trial was again taken up from the beginning and carried through with only three interruptions from all causes, the same cartridges being used as before.

The record of proceedings shows that the firing of the Maxim was very frequently interrupted by the transverse rupture of the cartridge shell.

In the final special test with an inexperienced crew about 1,200 rounds were fired. Of these, one belt of 250 rounds was fired without interruption, one belt with only one interruption, and of the remaining 700 rounds about 30 per cent failed.

If the peculiarities of a gun are such as to require a perfection of ammunition not obtainable with a commercial article of good quality, it is not serviceable and its failure can not properly be ascribed to defective ammunition.

Presumably the ammunition used was selected with the greatest care and the velocities measured at the proving ground were exceptionally regular.

Examining the official reports on file in the Navy Department as to the performance of this gun during the past four years, to discover whether the present failure can be considered unprecedented, I can find nothing to justify such an opinion.

Twice it is reported that it required perfect ammunition, and within a year an officer, witnessing the trial of a gun manufactured for the German Government, reports that it stuck badly.

An examination of the table giving the result of the firing at the 500 and 1,000 yard targets gives some idea of the relative efficiency of the guns.

The firing was for four consecutive minutes, including all delays and the time occupied in shifting the aim from one target to the other, and was all done on the same day under exceptionally favorable and uniform conditions.

The targets were so placed that it was necessary to train through an arc of about 20 degrees in passing from one to the other.

The percentages given in the last column of the table serve, to a certain extent, as a measure of the facility of aiming and economy of ammunition.

Test No. 9.—Targets 12 feet high and 30 feet long.

Gun.	Rounds fired in four minutes.	Hits.			Percentage of hits.
		500 yards.	1,000 yards.	Total.	
Gatling	1,547	305	207	512	33
Accles	795	215	149	364	46
Gardner	538	104	52	156	29
Maxim	720	275	124	399	55
Skoda	875	207	234	441	50

The Skoda gun fired for two minutes and forty-five seconds only, the ammunition supply giving out.

The Gatling fired without interruption and the Maxim had five interruptions in the first two minutes.

The Gatling scored 512 hits and the Maxim 399, but it is not to be supposed that the 1,035 rounds from the Gatling and the 321 rounds from the Maxim which did not score would have been entirely wasted in firing at as large a target as a ship.

Obviously the advantage is with the gun which fired the greater number of rounds.

If a gun will not deliver its fire when called upon the most phenomenal efficiency at some later but uncertain moment can not redeem the situation.

The Gatling gun has been in use in the naval service for many years and I have the honor to recommend that it be retained as the gun most likely to prove serviceable.

Respectfully,

C. S. SPERRY,
Commander, U. S. Navy, Senior Member.

The CHIEF OF THE BUREAU OF ORDNANCE,
Navy Department.

A.

APPOINTMENT OF BOARD FOR TRIAL OF MACHINE GUNS.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., July 5, 1894.

SIRS: You are appointed a board to conduct the competitive trials of the machine guns submitted by the makers, in accordance with the requirements of the circular issued by the Secretary of the Navy, March 22, 1894.

You will follow the programme outlined in the above-mentioned circular and submit your report in writing. You will recommend the gun or guns which you consider best adapted for use in the naval service.

The tests may be conducted at the Washington navy-yard and at Indian Head, as the board finds most convenient for the various tests.

Respectfully,

W. T. SAMPSON,
Chief of Bureau of Ordnance.

Lieut. Commander C. S. SPERRY, U. S. Navy.
Prof. P. R. ALGER, U. S. Navy.
Ensign A. C. DIEFFENBACH, U. S. Navy.

B.

TRIAL OF MACHINE GUNS.

The Navy Department proposes to test machine guns of different types in order to select a gun or guns for use on board vessels of the Navy.

Not less than 75 guns will be required, but the Department may decide to adopt guns of two types.

Only guns of small caliber, using smokeless powder and jacketed bullets, will be tried, and the guns submitted must be delivered to the commandant of the navy-yard, Washington, D. C., on or before the 1st of May, 1894.

Each gun must be accompanied by a statement of the price for which similar guns of 6 mm. caliber will be manufactured in the United States and delivered to the Navy Department, the prices named being for 50 and 100 guns respectively, either with or without field carriages.

Guns submitted without mounts will be tried if fitted for the Navy .45-caliber Gatling field carriage.

The mechanism must be suitable for a gun of 6 mm. caliber, and its adaptability to the use of rimless cartridges will be considered. The facility of dismounting and assembling the mechanism and of replacing important parts likely to be disabled by firing will be noted, the operations being performed by representatives of the gun and by others selected by the board.

Ten thousand rounds of suitable ammunition must be supplied with each gun for use in its test, and samples of this ammunition, taken at random and tested in a shoulder rifle, must show not less than 1,950 foot seconds muzzle velocity from a 30-inch barrel.

The guns will be fired for rapidity without aiming, with ordinary and extreme elevations and depressions. Rapidity and accuracy of aiming will be tested by target firing at moderate ranges, the gun being handled by its representatives and by others selected by the board.

Excessive pressure tests will be made by adding to the charge in the ammunition supplied a sufficient quantity of the powder used in the said ammunition to give a pressure of not over 60,000 pounds per square inch.

Cartridges with defective primers will be fired in order to determine the effect of "blow backs" upon the mechanism.

Such tests will be made as the board considers necessary to determine whether the gun is likely to be disabled by dust or rusting of the mechanism.

H. A. HERBERT,
Secretary of the Navy.

NAVY DEPARTMENT, *March 22, 1894.*

NAVY DEPARTMENT,
Washington, May 2, 1894.

The trial of machine guns referred to in the Department's circular, dated March 22, 1894, is hereby postponed to July 1, 1894. Guns not delivered at the Washington navy-yard on or about July 1, 1894, complete, and in every respect ready for test, will not be considered.

H. A HERBERT,
Secretary of the Navy.

C.

PROGRAMME OF TESTS FOR MACHINE GUNS.

U. S. NAVY BOARD,
Washington, D. C., July —, 1894.

The following tests are proposed, but may be changed in character or in order at the discretion of the board.

Due weight will be given to any special features, and the tests will be modified, if, in the opinion of the board, any of them are inapplicable through peculiarity of design of the gun.

(1) Into butt to determine general action of gun. (*a*) 100 rounds fired deliberately. (*b*) 100 rounds fired rapidly. Times not noted.

(2) Into butt for rapidity, gun clamped. (By exhibitor's crew if desired.) (*a*) 100 rounds. (*b*) 200 rounds. (*c*) 300 rounds. (*d*) one charger full, or 20 rounds. Times of each group noted.

(3) At Army B target (6 by 6 feet), distance about 25 yards, gun clamped. Crank shipped where desired by exhibitors. (*a*) 40 rounds. (*b*) 80 rounds. (*c*) 100 rounds. Time and score of each group noted.

(3*a*) Duplicate of (3), but crank shipped in a different position if the design permits.

(4) Duplicate of (3), but gun not clamped, directed as in service, and crank shipped where desired by exhibitors. Time and score noted as before.

(4*a*) Duplicate of (4), but crank shipped in a different position if the design permits.

(5) At Army B target, distance about 25 yards. (*a*) Gun clamped, fire for one-half minute. (*a*) Gun not clamped fire for one-half minute. Number of rounds and score noted.

(5*a*) For guns permitting it, a duplicate of (5), but crank shipped in a different place.

(6) Into butt. 100 rounds fired deliberately, every fifth cartridge being a dummy, to test effect of missfires upon action. (By exhibitor's crew if desired.)

(7) Replacing damaged parts of lock last fired. (By exhibitors crew if desired.) (*a*) Disabled lock. (*b*) Broken extractor. (*c*) Broken firing pin. Accidents supposed to take place, while hopper or charger is partially full. Time noted from order to replace a part until recommencement of firing.

After No. 7 the guns to be taken to the proving ground and the muzzle velocity determined.

(8) High-angle firing, noting extreme angles. With gun clamped (*a*) 200 rounds extreme elevation; (*b*) 200 rounds extreme depression. Series duplicated with gun not clamped and directed as in service. (*c*) 200 rounds, gun being continually moved in train and elevation. Note time and dispersion.

(9) Test for endurance. Targets 12 by 30 feet. (By exhibitor's crew if desired. Number and disposition of men as desired by exhibitors.) Fire with extreme rapidity for four consecutive minutes, as follows: First minute, on 1,000 yard target; second minute, on 500-yard target; third minute, on 1,000-yard target; fourth minute, on 500-yard target.

After (9) and determination of velocities, guns to be returned to the navy-yard.

(10) Defective ammunition. Fire five alternate good and defective cartridges from any one barrel.

(11) Excessive charges. Cartridges loaded to give a pressure equal to packed full case. Fire three from any one barrel.

(12) Dust test. Gun exposed (muzzle plugged) in a box to a sand blast for one minute. Gun cleaned without dismounting or disassembling, and then fired 100 rounds into butt. Time from beginning of cleaning to last shot noted. Cleaning and firing may be done by exhibitor's men.

(13) Test of effect of accidents. (By exhibitor's crew if desired.) (*a*) Stuck cartridge (cartridge stuck by rosin). (*b*) Broken extractor (one or more removed).

(14) (*a*) Disassemble completely. Time noted. (*b*) Assemble completely. Time noted.

(15) Any special tests which may seem advisable.

D.

RECORD OF PROCEEDINGS—TRIAL OF MACHINE GUNS.

U. S. NAVY-YARD,
Washington, D. C., July 6, 1894.

Board met at 2 p. m. Present, all members.

A programme of tests, copy appended marked C, having been agreed upon, the board proceeded with the examination and test of the guns presented, the representatives having complied with the terms of the circular published by the Secretary of the Navy.

The Maxim-Nordenfelt gun was the first examined, and the general features are as follows:

The gun submitted is one-barreled, automatic, and fitted with a water jacket as a cooling device. The barrel is set in its seat on trunnions and is easily replaced in case of wear.

The action of the mechanism is produced by the recoil of the cartridge acting on the breechblock. The latter, through the attached side plates inside the casing, feeds the cartridges from the belt, enters them in the chamber, and extracts and ejects the fired cases. Energy for the return of the lock to place is stored in a spiral spring operated by a fusee also attached to the side plates.

The trigger is operated by a press button on the breech operated by the thumbs, the hands grasping the breech by convenient handles. A safety gear is fitted, by the action of which, in continuous automatic firing, it is impossible for a cartridge to be fired before the breech is properly closed and the block locked.

The cartridges are packed in canvas belts of 250 rounds each, and, in introducing, each one requires the action by hand of two operations of the crank before automatic firing begins.

The caliber of the gun submitted is 8 mm. The length of the barrel is 30 inches. The gun is designed for rimless cartridges; the design, however, admits of the use of rimmed cartridges.

The minimum crew required is one man.

The weights, dimensions, and capacity of gun, feed cases, and ammunition chests are given in the table of weights, etc., appended, marked E.

After the completion of the examination and a trial of the mechanism with dummies the board adjourned till 10 a. m. the 7th instant.

U. S. NAVY-YARD,
Washington, D. C., Saturday, July 7, 1894.

Board met at 10 a. m. Present, all members.

Proceeded with the firing tests of the Maxim-Nordenfelt gun.

Gun mounted on tripod, crew of one man.

All tests for time started with gun empty and chargers in ammunition box. Water jacket filled.

Test 1.—(*a*) 100 rounds deliberately, (*b*) 100 rounds rapidly. No interruptions.

Test 2.—(*a*) 100 rounds, 16 seconds; (*b*) 200 rounds, 25.4 seconds; (*c*) 300 rounds, 40 seconds; (*d*) 20 rounds, 6.6 seconds. No interruptions. Steam coming from vent of jacket. Latter found half empty, and was refilled for next test.

Test 3.—(*a*) 40 rounds. An interruption of ten seconds took place to clear the chamber of a cartridge case which had been ruptured transversely, the head being extracted and the forward part remaining stuck in the chamber. The succeeding cartridge forced itself into the neck of the ruptured case and both were extracted by the action by hand of the lock. The last cartridge of the series was also found ruptured and would have caused another delay had the firing continued. (*b*) 80 rounds, 13.6 seconds. No interruptions. (*c*) 100 rounds. Interruption of 13.8 seconds, due to ruptured case. Total time, 30.4 seconds. Target No. 1 M.

Test 4.—Gun not clamped. (*a*) 40 rounds, 15.2 seconds; (*b*) 80 rounds. Interruption as before, lasting 1 minute 50 seconds. Special tool used to extract neck of case. Total time, 2 minutes 6 seconds. (*c*) 100 rounds. Interruption as before, lasting 23.2 seconds, neck of case pulled out with succeeding cartridge. Total time, 40 seconds. Target No. 2 M.

Test 5.—(*a*) Fired for one-half minute, gun clamped. One interruption from cause as before. Time to remedy included in half minute. Ended with two cartridges in lock. Number of rounds, 127. Target No. 3 M. (*b*) Fired for one-half minute, gun not clamped. No interruption. Number of rounds fired 222, and two cartridges in lock. Target No. 4 M.

Test 6.—Fired 100 rounds, every fifth cartridge a dummy. The dummies had been poorly made, and in several the bullets pulled out of the case, causing a jam. Otherwise, no interruptions.

Test 7.—(*a*) Replace disabled lock. Time, 15.4 seconds. No tools required. (*b*) and (*c*) were not carried out, as the design contemplates shifting the entire lock; the shifting of other parts to be done at leisure, the operations requiring considerable time.

The tests having been completed up to the point of taking the gun to the proving ground, the board proceeded with the examination and test of the next gun before it, namely, the Gatling.

This gun in its general design is the same as that in the service. The special features of the gun submitted for trial are:

Caliber .30. Length of barrel, 30 inches.

Number of barrels, 10. The barrels are set in diaphragms, inclosed by a casing for protection, and the expansion due to heating takes place to the front. No cooling device is used. A nut is fitted at the rear for adjusting the breeching-up, and a safety device is fitted at the side to throw the firing mechanism out of action.

The feed is positive, and consists of a hopper, which is simply an orifice, the cartridges on the feed strip entering on the left side, the empty charger being ejected on the right. The charger consists of a tin strip, on which the cartridges are held at intervals by lips punched from the strip. The action is that of a rack and pinion, the strip and cartridges forming the rack and the carrier block the pinion. The strip carries twenty cartridges, but can be made any length. A trough is supplied for use as feed guide, but its use is not a necessity.

Improvements in the mechanical features have been made, so that only a few screws are found in the gun and the number of parts is reduced.

The gun requires a minimum crew of 3 men.

The design admits of a motor attachment.

The action of the mechanism was tested with dummies, and the examination having been completed the board adjourned till 10 a. m. the following day.

U. S. NAVY-YARD,
Washington, D. C., Monday, July 9, 1894.

Board met at 10 a. m. Present, all members.

Proceeded with the firing tests of the Gatling gun. Gun mounted on tripod, crew of 2 men used where no aiming was done.

All tests for time started with gun empty, and charger in ammunition chest.

Feed guide used in all tests except test 2.

Test 1.—(*a*) 100 rounds deliberately. One interruption due to a jammed cartridge at commencement of firing; cause not determined. (*b*) 100 rounds rapidly. No interruptions.

Test 2.—(*a*) 100 rounds; time, 10.2 seconds. (*b*). 200 rounds. Interruptions due to jammed cartridge, caused by failure of feed strip to enter ejection aperture. Jam complicated by attempt on the part of the man turning the crank to turn the crank backward. Total time, 25.4 seconds. (*c*) 300 rounds. Two interruptions due to loose cartridges in feed strip dropping crosswise into carrier block, causing jamming. Two good cartridges lost in clearing. Total time, 1 minute 12.6 seconds. (*d*) One charger (20 rounds). Time, 4.4 seconds. No interruptions.

Test 3. Gun clamped; crank at the side. (*a*) 40 rounds, time 4.2 seconds. (*b*) 80 rounds; time, 9.4 seconds. (*c*) 100 rounds; time, 11.2 seconds. Target 1 G.

Test 3a.—Gun clamped. Crank at rear. (*a*) 40 rounds. One interruption of 25.2 seconds, due to jam as before. Two good cartridges lost. Total time, 30.2 seconds. (*b*) 80 rounds. One interruption of 7.8 seconds, due to failure of feed strip to enter properly as before. Strip useless temporarily. Replaced by new one and firing continued. Total time, 23 seconds. (*c*) 100 rounds. Three interruptions due to failure of strip to enter as before. New strips supplied and firing continued. Total time, 47.4 seconds. Target 2 G.

Test 4.—Gun not clamped. Crank at side. (*a*) 40 rounds, time, 5.6 seconds; (*b*) 80 rounds, time, 9.6 seconds. (*c*) 100 rounds, time, 15 seconds. No interruptions. Target 3 G.

Test 4a.—Gun not clamped. Crank at rear. (*a*) 40 rounds, time, 7.4 seconds; (*b*) 80 rounds, time, 9.6 seconds; (*c*) 100 rounds, time, 20.6 seconds. One interruption of 7.4 seconds in (*c*), due to jammed strip. New strip used. Effort on crank considerable toward end of firing and crankman inexpert. Target 4 G.

Test 5.—Fired thirteen strips and one cartridge of fourteenth. Fired for one half minute. Gun not clamped. Crank at side. Total number of rounds, 261. No interruptions. Target 5 G.

Test 5a.—Fired for one-half minute. Gun not clamped. Crank at rear. Fired 16 strips, 320 rounds. No interruptions. Target 6 G.

NOTE.—Test (*a*) in 5 and 5*a* (gun clamped) omitted as superfluous with this gun.

Test 6.—100 rounds, every fifth cartridge a dummy. One interruption, due to jammed feed strip as before.

Test 7.—(*a*) Replace disabled lock. Time, 35 seconds. (*b*) and (*c*) were omitted, as the design contemplates removing a lock entirely and firing with remaining ones, in case of damage to any part of lock.

The tests having been completed up to the point of taking the gun to the proving ground, the board proceeded with the examination and test of the next gun before it, namely, the Accles Improved Gatling.

This gun, as the name implies, is the Gatling gun with modifications and additions in some of the details.

The gun submitted is caliber .30, and has six barrels of 24 inches in length. The group of barrels is inclosed in a casing for protection and no cooling device is fitted. No exterior adjustment for breeching up is fitted, but a friction ring is fitted to take the forward thrust of the barrels and to diminish the crank effort, and a close breeching-up adjustment is possible.

As in the Gatling, the crank may be shipped at the side or rear, but in the former case the location is shifted to the trunnions, which has the advantage of less disturbing influence on the aim.

By the introduction of a clutch on the trunnion crank shaft, operated through a shaft and lever attached to a pistol grip on the side of the breech, the fire can be regulated, any number of shots being fired with continuous turning of crank.

A safety device is fitted by which the firing mechanism can be thrown out of action. This is operated by removable key.

The feed is positive and consists of a removable hopper on the left side of the gun. A pair of wheels with long teeth gearing into the cartridges in the feed strip are operated by gearing connected with a special wheel, which latter gears into a toothed band on the barrel cylinder of the gun. The special wheel has one tooth for each barrel, and the cartridges are thus taken from the feed strip and passed to the barrels as required.

The feed mechanism is thrown into action through a lever and clutch by the entering of the cartridges in the hopper, and automatically out of action when the cartridges are exhausted.

The feed strip consists of a pasteboard box inclosing 25 cartridges placed side by side in a tin strip, the strip being corrugated to properly space the cartridges. The box is closed by a paper flap, which is torn off before entering into hopper.

The gun requires a minimum crew of 3 men and the design admits of a motor attachment.

The action of the mechanism was tested with dummies, and the examination having been completed the board adjourned till 10 a. m. the following day.

U. S. NAVY-YARD,
Washington, D. C., Tuesday, July 10, 1894.

Board met at 10 a. m. Present, all members.

Proceeded with the tests of Accles Improved Gatling gun.

Gun mounted on field carriage. Crew of 2 men used where no aiming was done. All tests started with gun empty and charger in ammunition chest.

Test 1.—(*a*) 100 rounds deliberately. No interruptions. (*b*) 100 rounds rapidly. Two interruptions due to hang-fires, the cartridges exploding after almost complete extraction. Cartridge cases burst, but gun uninjured. Bullets remained seated in barrel, causing jams. Had to be backed out with cleaning rod.

Test 2.—(*a*) 100 rounds. Two interruptions as before. Total time, 1 minute 47 seconds. (*b*) 200 rounds. Three interruptions as before. Total time, 3 minutes 1 second. (*c*) 300 rounds. Two interruptions due to jammed cartridges, not to hang-fire. Cause of jam not ascertained. Total time, 2 minutes 1.8 seconds. (*d*) One charger (25 rounds). Time, 3.4 seconds. No interruptions.

Ammunition used for tests 1 and 2 loaded with Leonard smokeless powder.

A new lot loaded with rifleite was then used.

Test 3.—Gun clamped, crank at the trunnions. (*a*) 40 rounds. One cartridge lost by fumbling feed, time 24.6 seconds. (*b*) 75 rounds (three charges). Crank effort considerable, time 22.8 seconds. No interruptions. (*c*) 100 rounds. Crank effort considerable. Slight interruption caused by pistol-grip clutch being thrown out of engagement by jar. Total time, 36.6 seconds. Target 1 A.

Test 3a.—Gun clamped, crank at the rear. (*a*) 50 rounds (two charges), time 7.6 seconds. (*b*) 75 rounds (three charges), time 9.6 seconds. (*c*) 100 rounds, time not observed in order to discover cause of interruption. Found a cartridge had ruptured transversely, and forward half had remained in chamber. Found it impossible to remove this with the tools at hand. Gun was disassembled and barrel taken to shop and chamber cleared.

Representative's request for permission to withdraw the gun temporarily, on account of poor quality of ammunition referred to Chief of Bureau of Ordnance.

Temporary withdrawal of Accles gun authorized by telephone from the Chief of Bureau. Subsequently confirmed by letter; copy attached, marked F.

he board then proceeded with the examination of the Gardner machine gun glish pattern).

he gun submitted has two barrels and is operated by a crank at the side. Cali- .0.303 inch. Length of barrel, 30 inches. The barrels are held in place by a tan- t taper pin and are replaced in case of damage or wear without difficulty. ansion by heat is allowed for to the front. The barrels are inclosed in a bronze ing for protection and no cooling device is fitted.

he locks are horizontal and are operated by the crank through a closed cam in pieces integral with the lock. On the crank shaft also are cocking cams which k and fire by operating on a bell-crank lever, one end resting on the cam and the er resting in a mortise in the firing pin.

o sear or trigger is used, the arm of the cocking lever simply dropping off the l of the cam.

he recoil is transmitted through the locks to the crank shaft and thus to the ing in which it is journaled.

he extractor has no spring, but is cammed in and out of place on the cartridge d.

he feed is through one orifice for both barrels and is performed by gravity through ingle column feed guide standing vertical above the gun. The cartridges, when pped through the orifice, fall into place on the carrier block, which oscillates m side to side and carries the cartridges in front of the locks and in line with the rel. The lock then pushes the cartridge home. The carrier block is operated by m and lever from the crank shaft, and is fitted with blocks and springs which d the cartridge and guide it in the oscillation, disappearing by pressure under the k and rising again on the opposite side to eject the fired case from either side the gun. One revolution of the crank fires two shots, and a dwell of about 60 rees exists for the firing interval. The charger, which holds 23 rounds, consists of strips or blocks of wood in one of which the cartridges are set point down and e by side; the other piece lies on the heads, and the whole is held together by a er band. The feed guide or column has a T slot adapted to the heads of the tridges, and the charger is stripped of its ammunition by entering the heads in slot and pushing the covering piece and paper off and withdrawing the main ce of wood with the hand.

minimum crew of three men is required.

he action of the mechanism was tested with dummies, and the board adjourned 10 a. m. the next day.

U. S. NAVY-YARD,
Washington, D. C., July 11, 1894.

oard met at 10 a. m. Present, all members.

roceeded with the tests of Gardner machine gun.

est 1.—(*a*) 92 rounds (four chargers), deliberately. No interruptions. (*b*) 92 nds (four chargers) rapidly. One interruption through jam in feed.

est 2.—(*a*) 92 rounds (four chargers), time, 19.2 seconds. (*b*) 207 rounds (nine rgers), time 1 minute 1.6 seconds. Feeder fumbled, and nine cartridges lost. 299 rounds (13 chargers). Two failures to extract caused jam. Extractor pulled r and through head of cartridge. Cases had to be backed out by cleaning rod. nk effort very great, barrels very hot. Time of interruption, 4 minutes 29 seconds. tal time, 5 minutes 41.8 seconds. (*d*) One charger (23 rounds); time, 6.6 seconds. interruptions.

est 3.—Gun clamped. (*a*) 45 rounds (two chargers). Five cartridges lost in feed- , through fumbling due to design of charger, time 9.6 seconds. (*b*) 69 rounds ree chargers). Failure to extract as before, causing jams. Total time, 1 minute seconds. (*c*) 115 rounds (five chargers). Jam in feed occurred when all but ee cartridges had been fired, time to clear 20.2 seconds. Total time 37 seconds. get 1 Gr.

est 4.—Gun not clamped. (*a*) 46 rounds (two chargers), time 9.8 seconds. (*b*) ounds (3 chargers). Failure to extract as before caused two interruptions by in feed. Total time 2 minutes 16.8 seconds. The barrels were then cooled by ring water through them. (*c*) 115 rounds (five chargers). No interruptions. e 25.4 seconds. Target 2 Gr.

est 5.—(*a*) Gun clamped. Fired for one-half minute. Total, 173 rounds. Crank rt great toward end of firing. No interruptions. Target 3 Gr. (*b*) Gun not nped. Fired for one-half minute. Total, 124 rounds. Crank effort very great. interruptions. Target 4 Gr.

est 6.—Fired 100 rounds, every fifth cartridge a dummy. No interruption, but nk effort great, due to extraction.

est 7.—(*a*) Replace disabled lock. Jam on first trial. Repeated without inter- tion. Time 33.8 seconds. (*b*) Replace broken extractor, time 1 minute 38.6 nds. (*c*) Was not tried, as it is intended to shift entire lock in case of broken g pin.

The tests having been completed up to the point of taking the gun to the proving ground, the board proceeded with the examination of the next gun before it, namely the Skoda machine gun.

The gun submitted has one barrel, 22¼ inches long, fitted with a water jacket as a cooling device. The barrel is readily replaced in case of damage or wear.

The gun is operated automatically, after firing has been started by the action of the recoil upon the breech block. The mechanism consists essentially of three parts: (1) The breech block, containing the firing pin, sear, and trigger; (2) the recoil action proper, containing the strut block, counter-recoil spring, and check nut; (3) the firing attachment.

The breech block is pivoted at its lower end, and upon the explosion of the cartridge communicates the recoil to the strut block. The latter is pivoted at its rear end at a point in the same vertical plane, but above the axis of the barrel, and has a movement of oscillation downwards and to the rear. By its movement downward it cocks the firing mechanism in the breech block and operates the firing attachment. By the movement to the rear it stores energy for the closing and loading in a spiral spring in the breech.

The recoil is checked and regulated in two ways: (1) By the form of the cam faces on the strut block and breech block, these being so designed as to give slow and small opening of the block till the bullet is clear of the barrel; (2) by a check nut of coarse pitch which prevents too violent and sudden compression of the counter-recoil spring.

The firing attachment consists of a pendulum suspended directly beneath the breech and communicating its oscillation through a turn-buckle to a part which in its movement strikes the trigger and fires the gun. The oscillation is kept up by the movement of recocking of the trigger and by spring plungers, which act as cushions at the end of the stroke.

The speed of fire can be varied by moving the bob on the pendulum, and an additional regulation is by the turn-buckle, which shortens or lengthens the distance between the cushioned plungers. A safety button is provided by which the pendulum can be prevented from striking the trigger.

The feed is by gravity through an inclined guide fed by chargers, which empty the cartridges also by gravity. A positive-acting carrier block is fitted at the side of the breech at the bottom of the feed guide which is oscillated from side to side by the breech mechanism and which carries the cartridges from the feed guide in front of the breech block.

A crank is fitted at the breech which, by a cam through the strut block, loads and cocks the gun by hand. By swinging and controlling the pendulum the gun may be fired and the firing automatically continued for any number of shots.

A minimum crew of two men is required.

The examination having been completed, the board adjourned till 10 a. m. the next day.

U. S. NAVY-YARD,
Washington, D. C., July 12, 1894.

Board met at 10 a. m. Present, all members.

There being no ammunition on hand, the board met and adjourned from day to day till July 16.

Targets prepared, ammunition and gun accessories weighed, measured, and examined.

A letter was received from the Chief of the Bureau of Ordnance directing the temporary suspension of trials of Gatling and Accles guns. Copy attached, marked F.

U. S. NAVY-YARD,
Washington, D. C., July 16, 1894.

Board met at 10:15 a. m. Present, all members.

Proceeded with the retest of Gatling gun, using standard feed strips and new ammunition.

Test 1.—(*a*) 100 rounds, deliberately. (*b*) 100 rounds, rapidly. No interruptions.

Test 2.—(*a*) 100 rounds, time 9.8 seconds. (*b*) 200 rounds, time 28.2 seconds (without feed guide). (*c*) 300 rounds, time 36.2 seconds. No interruptions. Crank effort considerable toward the end of firing in (*b*) and (*c*). (*d*) 20 rounds (one charger), time 2.2 seconds. Two unfired cartridges lost by fumbling.

Test 3.—Gun clamped. Crank at side. (*a*) 40 rounds (two charges), time 5 seconds. (*b*) 80 rounds, time 8.2 seconds. (*c*) 100 rounds, time 12.2 seconds. One cartridge lost by striking feed strip on guide. No interruptions. Target 1a G.

Test 3a.—Gun clamped. Crank at rear. (*a*) 40 rounds, time 4 seconds. (*b*) 80 rounds, time 9 seconds. (*c*) 100 rounds, time 8.4 seconds. In (*c*) the chargers were laid out convenient for rapid firing. No interruptions. Target 2a G.

Test 4.—Gun not clamped. Crank at side. (*a*) 40 rounds, time 5 seconds. (*b*) 80 rounds, time 8.8 seconds. (*c*) 100 rounds, time 8.6 seconds. In (*c*) the chargers were laid out convenient for rapid firing. No interruptions. Target 3a G.

Test 4a.—Gun not clamped. Crank at rear. (*a*) 40 rounds, time 4.4 sesonds. (*b*) 80 rounds. After 7.4 seconds firing an interruption occurred due to hang-fire, the bullet remaining in the barrel and forward end of cartridge case in the chamber. Efforts to clear failing, the lock was removed and firing resumed with nine locks. Total time 6 minutes 20 seconds. Two cartridges lost by fumbling. (*c*) 100 rounds. No interruptions. Ten per cent of unfired cartridges lost, owing to having but nine locks in use. Time 10.8 seconds. Target 4a G.

Test 5.—(*a*) Omitted in Gatling and Accles types. (*b*) Gun not clamped. Crank at side. Fired for one-half minute. Total number of rounds, 173 inclusive of the 10 per cent of unfired cartridges. One jam occurred. Cause not ascertained. Time to clear included in the half minute. Crank effort considerable toward end of firing. Target 5a G.

Test 5a.—(*b*) Gun not clamped. Crank at rear. Fired for one-half minute. One interruption occurred due to difficult extraction. Crank effort toward end of firing considerable. Total number of rounds 153, inclusive of the 10 per cent of unfired cartridges. Target 6a G. An examination showed considerable unburned powder in the mechanism and chambers, which probably caused the sticking.

Tests 6 and 7 having been previously made, and the tests of this gun having been completed up to the point of taking the gun to the proving ground, the board proceeded with the examination of the next before it, namely, the Robertson machine gun.

The gun submitted has two barrels, 30 inches in length, chambered for the .30-caliber U. S. Army cartridge, and the barrels have a spread of one-sixteenth of an inch to give about 18 inches dispersion at 200 yards.

The gun is operated by a crank at the side of the breech, and the main features are that the barrels move forward and backward, the locks remaining stationary, and the cartridges in both barrels being fired simultaneously.

The barrels are held together by blocks which slide in the side frames acting as guides, and are very readily replaced in case of heating or wear. No cooling device is fitted.

The turning crank shaft carries a worm cam, 2 cocking cams, and a crank. The latter, through an open-jawed lever connected with a pair of links, vibrates barrels.

The cocking cams operate bell crank levers, one end of which rests on the cam and the other in a mortise in the firing pin.

The work cam, through studs on the end of a longitudinal shaft, revolves a wheel which feeds, holds, and carries the cartridges through the gun. This wheel, which is in a transverse plane, is notched semicircularly at intervals on its periphery to fit the cartridges, nd revolves directly in rear of the barrels, the latter being cut away to receive it.

The recoil is taken on a plate set into a transverse portion of the frame, and none of the shock is transmitted to the mechanism. The feed is a species of link belt, the links being composed of two layers of brass, and the cartridges forming the coupling pins.

The belt being entered in rear of the feed wheel and between it and the recoil plate, the first cartridge is laid in the notch in the wheel, a revolution of the crank moves forward the barrels, cocks the firing mechanism, returns the barrels to place, and releases the firing pins. The cartridges being fired, further revolution repeats the operation, and carries the feed belt with the fired cartridge cases through to the other side of the gun, where they are stripped from the wheel, no extractor being needed.

A safety cam is fitted by which the firing levers can be thrown out of action.

No dummies being available the gun was set at "safe," and a few live cartridges run through to show its operation.

The gun requires a minimum crew of 2 men.

The examination being completed, and new ammunition having arrived, the board recommenced the test of the Accles improved Gatling gun.

Test 1.—Union Metallic Cartridge Company's ammunition. (*a*) 100 rounds, deliberately; (*b*) 100 rounds, rapidly. No interruptions. Crank effort considerable.

Test 2.—Winchester Repeating Arms Company's ammunition. (*a*) 100 rounds. One interruption, due to transverse rupture of cartridge case, the forward end remaining in the chamber. Crank effort very great. Total time 8 minutes, 38.5 seconds.

It being evident from the appearance of the fired cartridge cases that the chambers had been enlarged and that the breeching-up adjustment was not correct, the tests were discontinued to permit examination of the gun by the exhibitors.

The board then adjourned till 10 a. m. the next day.

NAVY-YARD, *Washington, D. C., July 17, 1894.*

Board met at 10 a. m. Present, all members.

A letter was received from the Driggs Company as representatives of the Accles gun, requesting permission to temporarily withdraw the gun to repair the chamber. The Bureau's indorsement and the board's reply are attached, marked F.

Proceeded with the test of the Robertson machine gun. Gun on tripod. Crew of 1 man.

Test 1.—(*a*) 100 rounds deliberately; (*b*) 100 rounds rapidly. Two primers pierced and one leaked. Barrels very much heated. No interruptions.

Test 2.—(*a*) 100 rounds, time 26.8 seconds. (*b*) 200 rounds, time 58.6 seconds. A large percentage of pierced and leaky primers. Barrels heated sufficiently to ignite paper. Barrels cooled by pouring water through and over them. (*c*) 300 rounds, time 1 minute 44.8 seconds. Pierced and leaky primers as before. (*d*) 20 rounds. Interruptions due to hang-fire. No injury to gun. Gun cleared and test repeated. Time 9.6 seconds.

Test 3.—Gun clamped. (*a*) 40 rounds, time 15 seconds; (*b*) 80 rounds, time 21.8 seconds; (*c*) 100 rounds, time 28.8 seconds. No interruptions. Target 1 R.

Test 4.—Gun not clamped. The elevating gear is composed of an elevating arc held by pin for coarse pointing and a screw for fine pointing. (*a*) 40 rounds (pin in plate), time 14.4 seconds. (*b*) 80 rounds (pin out), time 25.6 seconds. (*c*) 100 rounds (pin out), time 33.8 seconds. In the cases where the pin was out the pointing was done after the feed belt had been entered and seat resumed. No interruptions. Target 2 R.

Test 5.—(*a*) Fired for one-half minute; gun clamped; number of rounds 100; no interruption; target 3 R. (*b*) Fired for one-half minute; gun not clamped; number of rounds 100; slight increase in crank effort during several revolutions, due to jam of links of feed belt between wheel and recoil plate, a portion of one link being forced into the chamber with the cartridge; target 4 R.

Test 6.—100 rounds; every fifth cartridge a dummy; no interruptions.

Test 7.—(*a*) Replace disabled lock, time 47.6 seconds. (*b*) and (*c*) were not carried out, as it is intended to shift the entire lock in case of damage to any parts.

The tests having been completed up to the point of taking the gun to the proving ground the board proceeded with the tests of the next gun before it, namely, the Skoda automatic machine gun.

Gun mounted on improvised mount on navy field carriage. Crew of 2 men. Tank of water mounted on carriage and connected by hose to water jacket giving circulation for cooling the barrel. Cartridges in chargers oiled.

Test 1.—(*a*) 100 rounds deliberately. (*b*) 100 rounds rapidly. No interruptions.

Test 2.—(*a*) 100 rounds, time 19.6 seconds. (*b*) 200 rounds, time 43.6 seconds. Two interruptions due to a slow feeding. (*c*) 300 rounds, time 57.8 seconds. One interruption due to hose slipping off nozzle of water jacket. Slipping caused by steam and vibrations. One unfired cartridge lost in the transfer of cartridges to feed guide. (*d*) One charger (25 rounds). No interruptions, time 7.2 seconds.

Test 3.—Gun clamped. (*a*) 50 rounds (two chargers), time 11 seconds. (*b*) 75 rounds (three chargers), time 14.2 seconds. (*c*) 100 rounds (four chargers), time 24.1 seconds. Slight interuption in (*c*) due to defective chargers. Target 1 S.

Test 4.—Gun not clamped. (*a*) 50 rounds (two chargers), time 10.2 seconds. (*b*) 75 rounds (three chargers), time 17.8 seconds. Slight delay due to fumbling of first charger. (*c*) 100 rounds (four chargers), time 17.6 seconds. Several interruptions caused by exhausting cartridges in feed guide, due to slow feeding, and failure of cartridges to feed down unless feed guide is nearly full. Target 2 S.

Test 5.—(*a*) Fired for one-half minute. Gun clamped. Number of rounds 197. Target 3 S. (*b*) Fired for one-half minute. Gun not clamped. Number of rounds 143. Target 4 S. Interruptions as in test 4.

Test 6.—100 rounds, every fifth cartridge a dummy. No interruption.

Test 7.—(*a*) Replace disabled lock. Time 56 seconds. (*b*) and (*c*) were not tried, as the design contemplates replacing entire lock in case of damage to parts.

The tests having been completed up to the point of taking the gun to the proving grounds, and the tug to transport the board, exhibitors, and guns to the proving ground being laid up for repairs, the board adjourned till Monday, July 23, 1894.

NAVAL PROVING GROUND,
Indian Head, Md., July 23, 1894.

Board met at 12 m. Present, all members.

Proceeded with the tests, as follows:

GATLING GUN.

Mounted on tripod. Crew of three men. Maximum elevation, 42 degrees; maximum depression, 60 degrees.

Test 8.—Gun clamped. Crank at side. (*a*) 200 rounds, extreme elevation, time,

23.5 seconds; (*b*) 200 rounds, extreme depression, time, 23.6 seconds. No interruptions.

Gun not clamped. Crank at side. (*a*) 200 rounds, extreme elevation, time, 21 seconds; (*b*) 200 rounds, extreme depression, time, 28.2 seconds. Crank effort considerable toward end of firing. (*c*) Gun not clamped, and moved continuously in train and elevation during firing. 200 rounds, time, 21.6 seconds. No interruptions. Control of gun imperfect, due to crank effort.

MAXIM-NORDENFELT GUN.

Mounted on tripod. Crew of one man. Maximum elevation, 20 degrees; maximum depression, 40 degrees. The extreme elevation was limited by the ammunition supply box and shape of tripod.

Test 8.—Gun clamped. (*a*) 200 rounds, extreme elevation, time, 1 minute 58.6 seconds. One interruption, due to ruptured cartridge case. (*b*) 200 rounds, extreme depression, time, 32.4 seconds. One missfire, caused by cartridge not feeding properly, due to excessive diameter in cannelure.

Gun not clamped. (*a*) 200 rounds, extreme elevation, time, 1 minute 28 seconds. Interruption as before. (*b*) 200 rounds, extreme depression, time, 25.8 seconds. No interruptions. Water in jacket replenished. (*c*) 200 rounds, gun moved continuously in train and elevation. Several interruptions as before. Control excellent. Time, 3 minutes 0.8 second.

SKODA GUN.

Mounted on field carriage. Crew of two men. Maximum elevation, 26 degrees; maximum depression, 42 degrees. Extreme elevation limited by inclination of feed guide and angle at which cartridges will feed down by gravity.

Test 8.—Gun clamped. (*a*) 200-rounds, extreme elevation, time, 42.6 seconds. Slight interruption, due to failure to feed down, caused by angle of elevation and by lack of full feed guide to force cartridges down. (*b*) 200 rounds, extreme depression, time, 33.2 seconds. No interruption.

Gun not clamped. (*a*) 200 rounds, extreme elevation, time, 1 minute 16.2 seconds. One interruption, due to premature explosion, caused by breechblock striking primer, the cartridge having failed to feed into chamber and the bullet striking on the side of the chamber. Liable to occur with large angles of elevation. No damage to gun. (*b*) 200 rounds, extreme depression, time, 31.6 seconds. No interruptions. (*c*) 200 rounds; gun moved continuously in train and elevation. Two interruptions, due to failure to feed down. Time, 44.6 seconds.

ROBERTSON GUN.

Mounted on tripod. Crew of one man.

At commencement of test several interruptions occurred, due to ruptured cartridge cases, caused principally by defect in design, the cartridge not being properly supported.

The trial was discontinued, the gun being permanently withdrawn. Letter subsequently received. Attached, marked H.

The board then adjourned till 10 a. m. the next day.

NAVY-YARD, *Washington, D. C., July 24, 1894.*

Board met at 10 a. m. Present, all members.

The necessary repairs having been made to the chamber of the Accles gun, the board proceeded anew with the tests of this gun. Gun on field carriage. Crew of three men.

Test 1.—(*a*) 100 rounds deliberately. One interruption, due to transverse split in cartridge case. (*b*) 100 rounds rapidly. No interruptions, but evidence of hang fires.

Test 2.—(*a*) 100 rounds, time, 20.6 seconds; (*b*) 200 rounds, time, 38.6 seconds; (*c*) 300 rounds, time, 2 minutes 33.2 seconds. Several interruptions, due to sticking and heavy crank effort, caused by unburned flakes of powder in the chamber. (*d*) One charger (25 rounds), time, 1 minute 21.6 seconds. Interruption as in (*c*).

Test 3.—Gun clamped. Crank at side. (*a*) 50 rounds (two chargers), time, 11.4 seconds; (*b*) 75 rounds (three chargers), time, 15.2 seconds; (*c*) 100 rounds (four chargers), time, 20.4 seconds. No interruptions.

Test 3 a.—Gun clamped. Crank at rear. (*a*) 50 rounds (two chargers), time, 6 seconds; (*b*) 75 rounds (three chargers), time, 33.4 seconds. Interruptions due to jam caused by loose cartridge getting into feed hopper. Six unfired cartridges lost. (*c*) 100 rounds, time, 14.5 seconds. Firing pins in one of the locks broke on last revolution of crank, and four cartridges passed through the gun unfired.

Test 4.—Gun not clamped. Crank at side. (*a*) 50 rounds, time, 11.4 seconds; (*b*) 75 rounds, time, 15.6 seconds. One hang fire, but no interruption. (*c*) 125 rounds, time, 25 seconds.

Test 4 a.—Gun not clamped. Crank at rear. (*a*) 50 rounds, time, 7.8 seconds. Very bad hang fire. Cartridge case blew out completely. Bullet stuck in barrel; slight delay to clear. (*b*) 75 rounds, time, 11.9 seconds; (*c*) 100 rounds, time 15.8 seconds. Ejection of pasteboard box of charger imperfect, requiring to be pulled out by hand. No delay.

Test 5.—(*b*) Fired for one-half minute. Gun not clamped. Crank at side. Number of rounds, 125. On turning crank after completion of firing one extractor dropped out of breech, having been bent and blown out of lock by a blow through a ruptured case. Replaced by new extractor.

Test 5 a —(*b*) Fired for one-half minute. Gun not clamped. Crank at rear. Number of rounds, 169. Jam at end of firing; another extractor bent as before, and caused jam in mechanism. Replaced by new one. (*a*) In tests 5 and 5 *a* omitted by board as unnecessary.

Test 6.—100 rounds; every fifth cartridge a dummy. Crank effort considerable at intervals, due to greater thickness of head of dummies.

Test 7.—(*a*) Replace disabled lock; time, 20.6 seconds; (*b*) replace broken extractor; time, 33.2 seconds. (*c*) Omitted, as it is intended to replace entire lock in case of damage to firing pin.

The tests having been completed up to the point of taking the gun to the proving ground, the board adjourned till next day.

NAVAL PROVING GROUND,
Indian Head, Md., July 25, 1894.

Board met at 11 a m. Present, all members.

Proceeded with the tests, as follows: *

GARDNER MACHINE GUN.

Mounted on tripod. Crew of three men.

Test 9.—Fired for 4 minutes. Gun not clamped. The great crank effort necessary so deranged the aim and scattered the shots that after the first minute the gun was fired clamped. An interruption occurred after firing, 2 minutes and 47 seconds, due to jam caused by difficult extraction, and the remainder of the 4 minutes was consumed in clearing. Total number of rounds, 538. Targets 5 Gr and 6 Gr.

GATLING MACHINE GUN.

Mounted on tripod. Crew of three men.

Test 9.—Fired for 4 minutes. Gun not clamped. Crank at side. Crank effort considerable after first minute. Crankman relieved about every minute. Total number of rounds 1,547. Targets 5 G and 6 G.

ACCLES IMPROVED GATLING MACHINE GUN.

Mounted on field carriage. Crew of three men.

Test 9.—Fired for 4 minutes. Gun not clamped. Crank at side. An interruption occurred after firing 3 minutes 49 seconds, due to ruptured cartridge case. Gun cleared at end of the 4 minutes. Crank effort considerable after first minute. Crankman relieved about every minute. Number of rounds fired, 795. Targets 5 A and 6 A.

MAXIM AUTOMATIC MACHINE GUN.

Mounted on tripod. Crew of two men.

Test 9.—Fired for 4 minutes. Gun not clamped. Five interruptions during first 2 minutes caused by ruptured cartridge cases. Neck of one case remained in chamber requiring use of tool to remove. Total number of rounds, 720. Targets 5 M and 6 M.

SKODA AUTOMATIC MACHINE GUN.

Mounted on improvised field carriage. Crew of two men.

Test 9.—Fired for 4 minutes. Gun not clamped. Occasional slight delays, caused by slow feeding and consequent failure of cartridge to feed down. Test stopped

* Twenty-five shots for each range were allowed for all guns, the hits included in the hits for 4 minutes. Time to change aim from one target to the other is included in the 4 minutes

at the end of 2 minutes 45 seconds for lack of ammunition. Total number of rounds fired, 875. Targets 5 S and 6 S.

The board then adjourned to meet at the proving ground next day.

NAVAL PROVING GROUND,
Indian Head, Md., July 26, 1894.

Board met at 11:30 a. m. Present, all members.

Proceeded with deferred tests as follows:

ACCLES IMPROVED GATLING GUN.

Mounted on field carriage. Crew of two men. Maximum elevation, 58 degrees; maximum depression, 10 degrees.

Test 8.—Gun clamped. (*a*) 200 rounds, extreme elevation, time 42.2 seconds; (*b*) 200 rounds, extreme depression, time 1 minute, 44.6 seconds. One interruption, caused by ruptured case.

Gun not clamped. Crew of three men. (*a*) 200 rounds, extreme elevation, time 40.2 seconds; (*b*) * 200 rounds, extreme depression, time 4 minutes 9.7 seconds; (*c*) † 200 rounds, continual change in elevation and train.

GARDNER GUN.

Mounted on tripod. Crew of three men. Maximum elevation, 12 degrees; maximum depression, 35 degrees.

Gun clamped.

Test 8.—(*a*) 184 rounds (eight chargers). Extreme elevation, time 30.8 seconds. (*b*) 184 rounds (eight chargers). Extreme depression, time 3 minutes 37.8 seconds. Crank effort great. Two interruptions, caused by failure to extract. Thirteen unfired cartridges lost in clearing. Duplicate of this test with gun not clamped not tried, as the gun is fitted with screw elevating and training gear. (*c*) 200 rounds, continued change in elevation and train. Three interruptions as before, time 4 minutes .6 seconds.

The ammunition was tested for velocity and the guns transported to the navy yard.

Letter from the inspector of ordnance in charge of the proving ground in reference to velocities attached marked I.

The board adjourned to meet at 10 a. m. next day.

NAVY-YARD, *Washington, D. C., July 27, 1894.*

Board met at 10 a. m. Present, all members.

Proceeded with the tests, the order of tests as laid down in the programme not being adhered to, in order to bring the excessive charge test last.

In the dust test the programme was so far changed as to permit exhibitors to clean the guns if desired, the total time being taken as laid down. Test 14 omitted for all guns.

GATLING GUN.

Test 12.—Dust test. Dusted one minute and fired 100 rounds. Chambers only wiped. Time, 46.7 seconds.

Test 10.—Defective ammunition. Thinned primers. No interruptions or damage.

Test 13.—Accidents. (*a*) Cartridges of one charger coated with rosin. No sticking apparent. (*b*) Extractor removed and charger started through at full speed. Case remained in chamber and next revolution a new cartridge was forced against it. Bullet driven into case and firing interrupted to clear. Firing pin left slight mark on primer, but although not retracted, the pressure of the mainspring not sufficient to cause explosion. No damage to gun.

Test 15.—Special tests. (*a*) Charger being much bent back and forth and run through gun. All cartridges fired; no interruptions. (*b*) Cartridges removed at intervals from charger. Required assistance by hand to pull through in firing, but no interruption. (*c*) Cartridges loosened and laid crosswise in charger. All fired and no interruptions. (*d*) Breeching-up adjustment slacked up to test effect of lack of support of cartridge. One charger full fired; no interruptions.

Test 11.—Excessive charges. Three cartridges loaded by shaking down powder in case as put in, and case loaded to base of bullet, but not tamped. All fired without damage.

This concluded the tests of this gun.

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* Four interruptions as before.

† Three interruptions as before, time 1 minute 46.2 seconds.

ACCLES IMPROVED GATLING GUN.

Test 12.—Dust test. Dusted one minute and fired 100 rounds. No cleaning done. Time, 22.6 seconds.

Test 10.—Defective ammunition. Thinned primers. No interruption or damage.

Test 13.—Accidents. (*a*) Cartridges of one charger coated with rosin. No sticking apparent. (*b*) Extractor removed, and charger started through at full speed. Same result as with Gatling gun, except that the firing pin is retracted and does not touch primer.

Test 15.—Special tests. (*a*) Tried effect of removing alternate cartridge in feed. No interruptions. (*b*) Tried effect of removal of first cartridge. Feed would not work, as the first cartridge is required to throw feed into gear. By taking one of the other cartridges and putting it in the first place in the feed strip it was made to work. (*c*) Tried effect of broken and bent charger. Cartridges were all displaced and the test a failure. (*d*) Tried effect of wet chargers. Three chargers tried. All collapsed from pressure required to work the lever which throws the feed into action and cartridges all displaced. Test a failure.

The representatives of the Accles gun submitted for the consideration of the board a sample of a new design of charger which it is claimed will overcome the difficulties of the one used in the tests, but as the present gun was not fitted for the new design it was not tried.

The letter of submittal is appended, marked J, and the sample charger is exhibited.

Test 11.—Excessive charges. Same test as with Gatling gun. No interruptions.

This concluded the test of this gun.

MAXIM-NORDENFELT GUN.

Test 12.—Dust test. Dusted one minute and fired 100 rounds. No cleaning done. Time 43.8 seconds. Two interruptions, due to ruptured cases.

Test 10.—Defective ammunition. Thinned primers. No interruptions or damage.

Test 13.—Accidents. (*a*) Exposed portion of 25 cartridges in a belt covered with rosin. All fired, no sticking apparent. (*b*) As the lock itself forms the extractor this test could not be tried.

Test 15.—Special tests. (*a*) Belt soaked in water for one-half hour. Fired 250 rounds. No interruptions. (*b*) Cartridges displaced in belt, and guide struts on belt bent. Fired 250 rounds. No interruptions. (*c*) Recoil spring disabled. Worked by hand; gun not thrown out of action. (*d*) Reduced charges. Thirty cartridges filled approximately with three-fourths, five-eighths, and one-half charges, in lots of 10. With spring set for normal charges (9¼ pounds on crank) the three-fourths charge failed to operate the mechanism. The spring tension was reduced successively to 8¼ and 6 pounds, at which tension the three-fourths charges operated, but the other charger failed. Normal charges were fired with the lowest tension and mechanism operated slowly but without interruption. The tension of the spring was then increased, and when the limit of 14 pounds was reached it was found that the return of the lock was too rapid to permit the cartridges to be properly entered in the chamber and interruptions were caused.

Test 11.—Excessive charges. Three cartridges prepared by shaking, but no tamping. Slight jam on first round. Lock recoil plate and tail spring broken on second round, requiring replacing of these parts. The damage was due to blowing through of the powder gases at the cannelure of the rimless cartridge case, which is of bad design. Third cartridge with excessive charge not fired, but 20 rounds of standard charges were fired to test action. No interruptions.

GARDNER MACHINE GUN.

Test 12.—Dust test. Dusted 1 minute and fired 92 rounds (four chargers). No cleaning done. Two interruptions, due to failure to extract. Time, 2 minutes 41.4 seconds.

Test 10.—Defective ammunition. Thinned primers. No interruptions or damage.

Test 13.—Accidents. (*a*) Stuck cartridge case not tried, as the results of such a test were shown a number of times during the trial. (*b.*) Broken extractor. Extractor removed and one charger full started through at full speed. Usual jam occurred, but no damage.

Test 15.—No special tests made.

Test 11.—Excessive charges. Three cartridges prepared as with other guns, and fired in same barrel. Extractor failed as in previous tests, and case had to be backed out with the cleaning rod.

This concluded the tests with this gun.

SKODA AUTOMATIC MACHINE GUN.

Test 12.—Dust test. Dusted for 1 minute and fired as follows: Fifty cartridges and chargers cleaned with hot water and soda and dried. Cartridges failed to feed down, mechanism failed to recoil, and after each fire had to be worked by hand. Time for 50 rounds, 6 minutes 39.8 seconds. Fifty cartridges and chargers, well oiled, were then tried and worked, but with several interruptions due to insufficient oil in chamber. Time, 1 minute 49 seconds.

Test 10.—Defective ammunition. Thinned primers. No damage or interruption.

Test 13.—Accidents. (*a*) Stuck cartridge case. Results of dry cartridges taken as test of this feature. (*b*) Broken extractor. Extractor removed and five oiled and five dry cartridges fired in rapid succession. The oil remaining in the gun chamber was sufficient to make the dry cartridges eject and the mechanism work without interruptions.

Test 15.—Special tests. (*a*) Diminished charges. Ten each of three-fourths, five-eighths, and one-half charges. Mechanism failed to recoil in every case and had to be worked by hand. (*b*) Tried effect of boat motion on pendulum by rocking the mount. Fired 20 shots without interruptions.

This concluded the tests with this gun.

The board then adjourned till Monday, July 30.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, July 30, 1894.

Board met at 9 a. m. Present, all members.

After an examination of the records, the board decided to further test, by firing, the Maxim gun.

About 1,200 rounds were fired, and the operation under normal conditions and with ruptured cases observed with inexperienced crews.

One belt (250 rounds) was run through and fired without interruptions.

Another belt was then started and about 30 per cent of the cartridges ruptured as in previous tests, causing numerous interruptions.

A third belt was started and about 200 rounds fired without interruptions, when one of the cartridges ruptured as in the excessive charge test, causing a stoppage to clear.

The remainder of the firing was done with continual interruptions as before.

The gun was fired and cleared by crews selected by the board, and in two instances additional instructions were required to assist in clearing jams.

In one case the special tool failed to clear the barrel quickly and the barrel was, therefore, replaced and firing continued.

The ammunition in the belts that fired without interruptions was claimed by the exhibitor to be of a separate lot.

The board then proceeded with the preparation of its report, adjourning from day to day till completion.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, August —, 1894.

The board, having completed its report, adjourned *sine die.*

A. C. DIEFFENBACH,
Ensign, U. S. Navy, Member and Recorder.

Weight, dimensions, etc., of machine guns submitted for trial, July, 1894.

Name of gun.	Character.	Caliber.	Number of barrels.	Length of barrels.	Observed velocities at 60½ feet mean of 10 shots.	Weight of gun.	Character of feed.
				Inches.		*Pounds.*	
Gatling	Hand crank, two positions.	0.30″	10	30	1,992	275	Positive.
Accles	do	0.30″	6	24	1,982	206	Do.
Maxim	Automatic	8 mm	1	30	2,079	59	Do.
Skoda	do	8 mm	1	22.5	1,819	28	Gravity.
Gardner	Hand crank	0.303″	2	30	2,042	115	Do.
Robertson	do	0.30″	2	30	Not obs.	71	Positive.
Accles new design of charger.							Do.

Weight, dimensions, etc., of machine guns submitted for trial, July, 1894—Continued.

Name of gun.	Chargers.			Weight of chargers for 1,000 rounds.	Ammunition chest.		Space per 1,000 rounds.
	Character.	Capacity.	Weight empty.		Capacity.	Outside dimensions.	
		Rounds.	*Ounces.*	*Pounds.*	*Rounds.*	*Inches.*	*Cu. feet.*
Gatling	Tin strip	20	7.68	24	1,280	28×14×17	3.01
Accles	Tin strip inclosed in cardboard box.	25	5.12	12.8	1,125	18×11×12	1.22
Maxim	Canvas belt	250	56	14	500	26× 8× 5	1.20
Skoda	Steel case to fill feed guide.	25	20	50	(*)		
Gardner	Two wood strips held by paper band used to fill feed guide.	23	8	21.8	851	21×15×10	2.14
Robertson	Brass link belt	100	2	20	(*)		
Accles new design of charger.	Tin trough with corrugated bottom and lips to hold the cartridges, all wrapped in paper.	25	5.75	14.4			

* None submitted.

F.

No. 4272. BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington, D. C., July 12, 1894.

SIR: In compliance with the request of the exhibitors of the Gatling gun and of the exhibitor of the Accles gun, the Bureau directs the temporary suspension of the trial of these guns.

When the exhibitors report that they are ready to proceed the board may, if considered advisable, repeat that portion of the trial already gone through with.

Respectfully,

W. T. SAMPSON,
Chief of Bureau of Ordnance.

SENIOR MEMBER OF THE BOARD FOR TRIAL OF MACHINE GUNS.

G.

BOARD OF MACHINE GUNS,
NAVY DEPARTMENT, BUREAU OF ORDNANCE,
Washington, D. C., July 19, 1894.

SIRS: The board has the honor to inform you that the Chief of Bureau of Ordnance having approved your request of the 17th instant to temporarily withdraw the Accles gun in order to remedy the enlargement of the chambers, the gun is at your disposition.

When the gun is resubmitted the trial will commence afresh.

Respectfully,

C. S. SPERRY,
Lieut. Commander U. S. Navy, Senior Member of Board.

THE DRIGGS ORDNANCE COMPANY,
700 Fourteenth Street NW., Washington, D. C.

DRIGGS ORDNANCE COMPANY,
Washington, D. C., July 17, 1894.

SIR: We have the honor to state that we have just discovered that the size of the chambers in the Accles gun barrel is several hundredths above the maximum tolerance. We therefore respectfully request permission to remedy this defect.

Very respectfully, your obedient servants,

THE DRIGGS ORDNANCE COMPANY,
By JNO. N. WILLIAMS,
Vice-President.

Commander C. S. SPERRY, U. S. Navy,
Chairman Machine-Gun Board, Navy Department.

H.

WASHINGTON, D. C., *July 28, 1894.*

SIR: I beg to inform the board that I have concluded to withdraw the machine gun submitted by me for trial at the navy-yard.

This gun passed through the first half of the tests quite successfully, and probably would have completed the trial with equal success had I been supplied with as good ammunition as was used by the other guns in the contest.

My gun may be, and probably is, a little weak around the firing chamber, but that is a matter of construction, easily overcome in making another gun.

I trust the board will not deem it out of place for me to suggest that in my opinion this trial should be continued, and that each gun entered be furnished with the 6-mm. barrels, to be used by the Navy in the future, and that the ammunition used in the trial be furnished by the Navy Ordnance Bureau, so that all the guns will be on a level in that respect, and none can put in the plea of "bad ammunition."

I thank the board for their uniform kindness and courtesy.

I am, very respectfully,

G. W. ROBERTSON.

Commander SPERRY,
Senior Member Trial Board, Navy Department.

I.

VELOCITIES WITH MACHINE GUNS.

NAVAL PROVING GROUND,
Indian Head, Md., July 31, 1894.

SIR: In compliance with your verbal request, I have to forward herewith a record of the observed velocities taken with the machine guns submitted for competitive test. These velocities have not been corrected to the muzzle. The ammunition used was that furnished with the guns.

GARDNER (Caliber about 0.303 inch).

Gun No. 843, 1893. Distance to first screen, 17 feet 5 inches; distance between screens, 30 meters = 98 feet 5 inches. Barometer, 29.79 inches; thermometer, dry, 90°; wet, 74°. Wind, ↙ 3 miles per hour. Ammunition: G. Kynock & Co., Limited, Wilton, Birmingham, rifleite powder.

Observed velocity.

	Foot seconds.		Foot seconds.
1	2,066	7	2,035
2	2,070	8	2,026
3	2,121	9	2,010
4	2,013	10	2,035
5	2,056		
6	1,981	Average	2,041

GATLING MACHINE GUN (Caliber about 0.30 inch).

Gun No. 2000. Distance to first screen, 17 feet 2 inches; distance between screens, 30 meters = 98 feet 5 inches. Ammunition, Winchester Repeating Arms Company. Barometer, 30.01 inches; thermometer, dry, 87°; wet, 80°. Wind, ↘ 2 miles per hour.

Observed velocity.

	Foot seconds.		Foot seconds.
1	2,042	7	1,995
2	2,039	8	1,970
3	1,925	9	1,935
4	1,968	10	2,014
5	1,993		
6	2,035	Average	1,992

ACCLES MACHINE GUN (Caliber about 0.30 inch).

Gun No. Pat. 1892. Distance to first screen, 17 feet 2 inches; distance between screens, 30 meters = 98 feet 5 inches. Barometer, 30.25 inches; thermometer, dry, 90°; wet, 83°. Wind, ↓ 2 miles per hour. Ammunition, Winchester Repeating Arms Company.

Observed velocity.

	Foot seconds.		Foot seconds.
1	2,009	7	1,950
2	1,978	8	1,895
3	2,022	9	1,991
4	2,005	10	2,022
5	1,899		
6	1,997	Average	1,977

MAXIM AUTOMATIC GUN (Caliber about 0.315 inch).

Gun No. 32. Distance to first screen, 17 feet 1 inch; distance between screens, 30 meters = 98 feet 5 inches. Barometer, 30.01 inches; thermometer, dry, 87°; wet, 80°. Wind, ↘ 2 miles per hour. Ammunition, D. M. 1894 K. Smokeless powder (Maxim?). (See Appendix K.)

Observed velocity.

	Foot seconds.		Foot seconds.
1	2,061	7	2,072
2	2,033	8	2,131
3	2,114	9	2,061
4	2,046	10	2,093
5	2,096		
6	2,079	Average	2,078

SKODA AUTOMATIC GUN (Caliber about 0.303 inch).

Gun No. 9. Distance to first screen, 17 feet 2 inches; distance between screens, 30 meters = 98 feet 5 inches. Barometer, 30.01 inches; thermometer, dry, 87°; wet, 80°. Wind. ↘ 2 miles per hour. Ammunition unknown, foreign. Smokeless powder.

Observed velocity.

	Foot seconds.		Foot seconds.
1	1,835	7	1,819
2	1,841	8	1,798
3	1,848	9	*1,828
4	1,785	10	1,840
5	1,829		
6	1,769	Average	1,819

Very respectfully,

N. E. MASON,
Lieutenant, U. S. Navy, Inspector Ordnance in charge.

Commander C. S. SPERRY, U. S. Navy,
Senior Member Board on Machine Guns,
Bureau of Ordnance, Navy Department, Washington, D. C.

J.

DRIGGS ORDNANCE COMPANY,
Washington, D. C., July 27, 1894.

SIR: We have the honor to present herewith for the board's consideration a new feed case, which we propose to furnish for use in the Accles gun.

This new case is made entirely of tin and consists of a tin strip bent up at each side so as to support each end of the cartridge and just fit the feed slot in the gun. Down the center of this strip is a narrow fixed fluted strip with corrugations similar to the strip formerly used in the paper boxes, but in order to hold the cartridges in place holes are punched through the corrugations forming thin lugs, which, when the cartridges are placed in position, snap around them and retain them in place.

These new cases are the same length as the former ones and can be packed in ammunition chests economically. It is intended to insert the cartridges at the factory, and the filled cases are protected by prepared paper covers, which can be instantly torn off.

We claim for this new case the following advantages over the paper-box feed formerly used: Greater stiffness (and therefore more certainty of action), proof against moisture, and greater rapidity of fire. This last advantage is obtained by reason of the fact that the case passes entirely through the feed and each case can be immediately followed by another, the cases not having to be thrown out of the top of the feed as was the case with the paper boxes.

The paper boxes are intended to be used but once, as using them a number of times destroys their edges and impairs their use; but it is our intention with the new cases to make those intended for drill purposes and target practice aboard ship, where they can be easily recovered, with the fluted strip made of steel. A fair amount of use will then not injure the lugs, and consequently a smaller number of packed rounds can be carried.

Very respectfully, your obedient servants,

THE DRIGGS ORDNANCE COMPANY,
By L. L. DRIGGS, *Secretary.*

Commander C. S. SPERRY, U. S. Navy,
President Machine Gun Board, Navy Department, City.

K.

VICTORIA MANSION,
32 Victoria Street, London, July 21, 1894.

DEAR SIR: Replying to your letter of 10th instant, we have the pleasure to inform you that we understand the name of the makers of the powder in the German cartridges which we have sent for trial is the United Cologne Rottweil Company; that the place of manufacture is near Cologne in Germany, and that the powder contains nitroglycerine.

In a letter from Huber, we are requested to inform him whether the German cartridges for rifles have their bullets crimped, or if it was done specially for the maxim gun. Please note, that after having inquired in Germany, we have just been informed that the cartridges for the German rifles have their cases choked or crimped on the bullet exactly the same as those we sent for use at the trial of our Maxim guns in the United States.

Yours, faithfully,

For the MAXIM-NORDENFELT GUN AND AMMUNITION COMPANY.

GEORGE C. GORHAM, Esq.,
Washington.

Test 9.—Targets.

[Distance, 500 and 1,000 yards. Dimensions of targets, 12 by 30 feet. Four minutes firing.]

Gun.	Symbol.	Total number of shots.	Number of hits.			Percentage of hits.
			500 yards.	1,000 yards.	Total.	
Maxim	5 M. 6 M.	720	275	124	399	55.4
Gatling	5 G. 6 G.	1,547	305	207	512	33.1
Accles	5 A. 6 A.	795	215	149	364	45.8
Skoda	5 S. 6 S.	875	207	234	441	50.4
Gardner	5 Gr. 6 Gr.	538	104	52	156	29.0

NOTE.—Skoda gun ceased firing after two minutes and forty-five seconds, from lack of ammunition.

No. 8.

REPORT OF BOARD ON SMALL ARMS.

NAVAL TORPEDO STATION,
Newport, R. I., March 9, 1894.

SIR: In obedience to the Department's order, the board on smal arms met at Newport on March 6, 1894, and in accordance with the

directions contained in the Bureau's letter, No. 1167, dated February 28, 1894, has the honor to report as follows:

The weight of the charge of rifleite best adapted to the gun and cartridge as now designed is 36 grains, and this charge is deemed sufficiently satisfactory for use in the test for endurance and for the selection of a mechanism.

This charge gave, as a mean of thirty shots, a velocity of 2,454 foot-seconds at 60 feet from the muzzle, and a maximum pressure, from a mean of thirty other shots, of 44,000 pounds per square inch.

No changes in the gun or ammunition are suggested, but the board recommends that experiments with them be continued at the torpedo station, and that the following features be specially investigated:

Maximum penetration in various materials at different ranges.

Erosion, wear, and expansion of barrel, and their effect on the velocity, penetration, and stability of projectile.

Effect on penetration, velocity, and barrel of other designs of bullet.

Effect on velocity of various depths of bullet insertion and of crimping.

Two lengths of barrel, 30 and 29 inches, were tried, and a mean of ten shots with the reduced length of barrel gave 2,390 foot seconds or 64 foot seconds less than that given with the longer barrel. These results, together with other considerations, lead the board to the belief that the length of barrel best adapted to the naval service is 30 inches.

A bayonet of the knife or sword pattern is recommended. The dimensions and details of the bayonet and the nature and character of sights to be adopted not being essential to the development of the arm at its present stage, the board deems them of sufficient importance to warrant further investigation before deciding as to their design.

The general character of other necessary fittings and appurtenances have been considered and are provided for in the appended circular.

In accordance with paragraphs 2 and 3, of the Bureau's letter, a circular has been drawn up for approval and issue, containing a programme of tests and a statement of the conditions and requirements to be fulfilled by persons submitting small arms, and it is hereto appended, marked A. This circular has been drawn up with special regard to the best method of obtaining proposals for the arm best adapted to the naval service.

The board is of the opinion that a minimum time of four months from the receipt of the circular will be necessary for the development of designs by inventors, and the 1st of August next is recommended as the date for the beginning of the tests.

In view of the increased cost of small orders, and the disadvantages of a lack of competition resulting from a reluctance to bid on new designs, the board recommends that a sufficient number of arms be ordered at one time to meet all the probable requirements of the service.

Respectfully submitted.

GEORGE A. CONVERSE,
Commander, U. S. Navy, and Senior Member.
GEO. C. REID,
Captain, U. S. Marine Corps, Member.
PHILIP R. ALGER,
Professor, U. S. Navy, Member.
A. C. DIEFFENBACH,
Ensign, U. S. Navy, Member.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

A.

TO INVENTORS AND OTHERS WHO DESIRE TO SUBMIT SMALL ARMS TO TEST FOR ADOPTION FOR THE NAVAL SERVICE.

NAVY DEPARTMENT,
Washington, D. C., March 15, 1894.

epartment hereby publishes that on August 1, 1894, a naval board will con- the Naval Torpedo Station, Newport, R. I., for the test of magazine rifles for adoption for the Navy and Marine Corps. The tests will be for the selec- breech closure and magazine adapted to the caliber and ammunition already upon by the Department, and only such arms will be considered as are sub- subject to the specifications and tests laid down in the circular, which will be ed upon application to the Bureau of Ordnance, Navy Department, Washing- C. Persons wishing to submit arms must deliver them to the inspector of ce at the Naval Torpedo Station, Newport, R. I., on or before August 1, 1894.

H. A. HERBERT,
Secretary of the Navy.

[Circular.]

EMENTS FOR THE TEST OF RIFLES BEFORE THE NAVAL SMALL ARMS BOARD.

ifle will be tested or considered by the board unless the following conditions een complied with:

ach rifle must be accompanied by a letter, which should be addressed to the ent of the Naval Small Arms Board, Torpedo Station, Newport, R. I., stating tly that it is ready for all the tests laid down by the board, and is submitted t thereto.

ld any arm, however, be submitted, the novel features of which render any tests inapplicable, such arm may be considered, at the discretion of the board.

ach rifle must also be accompanied by a written agreement either to manufac- ch arms in the United States, or to sell the right to manufacture them, for prices. Both the price for the finished arm and that for the right to manu- e it are to be on the basis of an order for 5,000 or 10,000 arms. An offer to acture will only be considered satisfactory when made by a responsible firm a plant suitable for such work. An offer to sell the right to manufacture will e considered satisfactory when accompanied by proof that the person or per- fering to sell have the right to do so. Willingness to manufacture, or to sell ht to manufacture, any special part or combination of parts of an arm should e stated.

he small arm adopted for the naval service, and upon which bids are required, ave the following general characteristics:

ber.—6 mm. (0.2362 inch).

th of barrel.—30 inches.

ng.—Six grooves: one turn in 6½ inches.

et.—Steel-jacketed; 135 grains weight.

ridge.—Brass; maximum capacity, 40 grains of rifleite

ge.—About 36 grains.

form and depth of rifling and the dimensions of chamber and receiver thread own on drawings, of which prints may be had on application to the Bureau of nce, Navy Department.

mechanism and all parts of the arm must be designed and constructed to stand aber pressure of 60,000 pounds per square inch.

g swivels, a suitable cleaning rod, the stock, mechanism, magazine, and all fittings necessary to the efficiency of the arm, except the sights and bayonet, e considered as included in the price bid for the manufacture. The barrels e supplied by the Government, rifled, and finish machined, but unchambered, ith the receiver thread uncut. The sights and bayonet will also be supplied Government, but the lug for the front sight must be made and secured by the ctor, and both the sights be fitted and properly adjusted.

o arm not having the caliber and characteristics stated in the preceding para- will be tested or considered by the board.

'els, rifled and finish machined, but unchambered and with receiver thread and ammunition for private tests, will be supplied at cost price upon applica- the Bureau of Ordnance.

aunition for the official tests will be supplied by the Government.

cartridge cases for the above ammunition will be rimmed.

s using rimless cartridges, but not otherwise different from the standard, will ed, if submitted, but cartridge cases suitable for such arms must be supplied *persons submitting them.*

5. The following will be the order of tests, subject to such changes or additions as the board may decide, due notice being given of the introduction of new or special tests.

I.—*Safety and general action.*

(*a*) Fired, 20 shots as single-loader with deliberation by the exhibitor as a test of manipulation by an expert, or one familiar with the arm, and may be accompanied by verbal explanations as desired.

(*b*) Fired, 20 shots as above by a person to be designated by the board, as a test of manipulation by one *not* familiar with the arm.

II.—*Endurance.*

Fired, 500 continuous rounds without cleaning, the gun being examined at the end of each 50 rounds.

III.—*Defective ammunition.*

(*a*) Fired, 10 shots with alternate good and defective cartridges and the action observed, as a test for clogging and safety. (For the purposes of this test primers will be made defective by thinning the cup.)

(*b*) The power of the extractor will be tested by the use of cartridge cases made to stick by resin or in some other suitable manner.

IV.—*Excessive charges.*

Fired, 5 shots with lanyard.

Cartridges loaded with charges established by the board to give a maximum pressure of about 60,000 pounds per square inch, the pressure to be that due to full cartridge case (40 grains of rifleite or its equivalent).

V.—*Rapidity with accuracy.*

(*a*) Fired from the shoulder, 20 shots as magazine gun, beginning with magazine charged.

(*b*) Fired from the shoulder, for two minutes as magazine gun, beginning with magazine charged.

In these tests a target 6 feet by 2 feet, distant about 100 feet, will be used, hits only being counted.

VI.—*Disassembling and assembling.*

The facility with which the breech mechanism and magazine system can be completely taken apart and put together, to be noted.

NOTE.—Tests V and VI are to be made by the exhibitor, as tests of manipulation by an expert, or one familiar with the arm, and may be accompanied by verbal explanation, as desired, at the various stages of operations.

These tests are then to be duplicated, by a person to be designated by the board, as tests of manipulation by one *not* familiar with the arm. They will be designated Tests VII and VIII.

In each case the entire series is to be completed by the same person.

IX.—*Dust.*

Fired, 10 shots after each exposure to sand blast during two minutes, as follows:

(*a*) Magazine empty, breech closed.

(*b*) Magazine filled, breech closed.

(*c*) Magazine empty, breech open.

(*d*) Magazine filled, breech open.

All shots to be fired from magazine. No dismounting to clean will be allowed, but before firing sand may be blown off and the gun wiped with the hand.

X.—*Rust.*

The breech mechanism, receiver, and magazine being cleansed of grease, the chamber greased and plugged, and the breech action closed, the butt of the gun to be inserted up to the chamber in a solution of sal ammoniac for ten minutes, exposed for two days to the open air, standing in a rack, and then fired 20 shots from the magazine.

XI.—*General examination by the board.*

Withdrawal of any arm for repairs and its subsequent reentry may be allowed, at the discretion of the board, but the arm withdrawn will, if reentered, be again subject to all the tests.

In general, all firings will be done from the magazine, unless otherwise stated.

Inventors or authorized agents only will be recognized as representatives, and these persons may be present at all tests. Except in Tests I, V, and VI, the arm is not to be touched by the inventor or agent.

Objections to methods of procedure at any stage must be made at the time, and, if required, reduced to writing.

Any suggestions which are deemed necessary to the safety of the operator or the arm should be promptly made to the senior officer of the board.

All submitted arms will remain in the custody of the board until all tests and examinations have been completed.

W. T. SAMPSON,
Chief of Bureau of Ordnance.

BUREAU OF ORDNANCE,
Navy Department, March 15, 1894.

REPORT ON MIDVALE SMALL-ARM BARREL STEEL.

OFFICE OF INSPECTOR OF ORDNANCE,
Hartford, Conn., April 3, 1894.

SIR: I have the honor to make the following report on the qualities of the small-arm barrel steel received for experiment from the Midvale Steel Company:

There were received two lots, as follows: Five barrels, marked 6384; two barrels not marked.

Two were selected from the lot of five and one from the lot of two (called respectively M 1, M 3, and M 5) and started in the works by the Pratt & Whitney Company.

One barrel, also of the first lot of five, was selected and sent to the Winchester Repeating Arms Company.

Specimens M show a lack of homogeneity and signs of hard spots, both in turning and drilling. The drill was reground three times, and the hole ran out about half a diameter. The barrel was sprung, and required considerable straightening after each subsequent operation. M 3 acted much better, the bad qualities being of a much less degree. Not much straightening was required, and the hole did not run out. The drill, however, required to be reground twice.

The report of the specimen of this same lot, sent to the Winchester Company, was that it was the worst they had ever tried.

M 5, representing the lot of two, was easily worked, and the hole was good. The drill was not reground, and the barrel required only normal straightening.

Of these barrels M 1 and M 5 were fitted to the gun for Indian Head, and M 3 was sent to Newport to replace the one cut off.

Considering all the specimens sent here for experiment, the following is believed to be the order as to facility of machining:

1. Bethlehem, nickel (4.5 per cent).
2. Midvale (second lot).
3. Midvale (first lot).
4. Carpenter (first lot).
5. Bethlehem, plain.
6. Carpenter (second lot).
7. Bethlehem, nickel (27 per cent).

Of these 5, 6, and 7 are considered commercially useless.

Not enough firing has been done to judge of their endurance, but so far the 4.5 per cent nickel steel has shown the least expansion of chamber.

Very respectfully,

A. C. DIEFFENBACH,
Ensign, U. S. Navy, Inspector of Ordnance.

CHIEF OF BUREAU OF ORDNANCE,
Navy Department, Washington, D. C.

TEST OF 6-MM. RIFLE BARRELS.

[Memorandum No. 1 for the inspector of ordnance.]

NAVAL PROVING GROUND,
Indian Head, Md., April 30, 1894.

Five 6-mm. rifle barrels, A, B, C, M 1, and M 5, were received on April 7. Three of the barrels were mounted on ordinary wooden stocks, fitted with Winchester breech mechanism. One of the barrels was fitted with a telescope sight, adaptable to either of the other barrels. A chamber gauge and template were received April 12, also 260 rounds of ammunition from the Winchester Repeating Arms Company, charges loaded by weight. The barrels were calipered outside, at muzzle, in rear of sight lug, at three places along the barrel 6 inches apart, and over chamber. The chamber gauge was tried in each barrel and found to fit neatly. Each of the barrels was also accurately weighed.

April 13 experiments were begun to determine velocities, using ammunition loaded by weight from the 260 rounds first received. Three chronographs were used, screens 30 meters apart. Rifles fired from shoulder, using tripod rest; first screen distant 17.5 feet from muzzle of gun. Screens strung with fine copper wire, bullet usually cutting two wires. Blotting paper target rigged behind last screen, making impacts of bullets very clearly, bullets passing on into sand butt. All cartridges tried in chamber gauge template before firing. Gun cleaned with a piece of oily waste and wiped dry with another piece without oil. The results are given in table below:

TABLE 1.—*Firing for velocity, 6 mm.*

Date.	Barrel.	Elevation.	Barometer.	Thermometer. Attached.	Thermometer. Wet.	Thermometer. Dry.	Wind. Direction.	Wind. Force.	Chronographs. A.	Chronographs. B.	Chronographs. C.	Chronographs. Mean.	Impact.	Remarks.
		°												
April 13	A	0	29.94	66	50	57	↘	12	2399	2408	2417	2408	Oblique.	
	A	0							2486	n. r.	2483	2485	...do	
	A	0							2405	*2368	2402	2404	...do	
	A	0							2460	2463	2466	2463	...do	
	A	0							2470	2456	2460	2462	...do	
	A	0							2444	2437	2444	2442	...do	
April 19	A	0	30.07	70	67	73	Calm ...	0	2480	2486	2473	2480	...do	
	A	0							2507	n. r.	n. r.	2507	...do	
	A	0							n. r.	2453	2450	2452	...do	
	A	0							2450	2240	n. r.	2450	Normal.	Struck wood of screens.
April 17	B	0	30.08	72	64	69	Calm ...	0	2380	2371	n. r.	2376	Oblique.	
	B	0							n. r.	2458	2456	2457	...do	
	B	0							2421	2431	2444	2432	...do	
	B	0							2440	*2418	2447	2444	...do	
	B	0							2450	2447	2434	2444	...do	
April 19	B	0	30.02	77	68	78	Calm ...	0	2511	2487	2497	2498	...do	
	B	0							2412	2428	n. r.	2420	...do	
	B	0							2525	n. r.	n. r.	2525	...do	
	B	0							2483	2474	2470	2476	Normal.	
	B	0							2405	2399	2412	2405	Oblique.	
April 18	C	0	30.25	67	57	60	↖	4	n. r.	2466	n. r.	2466	...do	
	C	0							2434	2440	2434	2436	Normal.	
	C	0							2483	2487	2483	2484	Oblique.	
	C	0							2456	2444	2456	2452	...do	
	C	0							2324	2315	2324	2321	...do	
	C	0							2456	2447	2456	2452	...do	
April 19	C	0	30.07	70	67	73	Calm ...	0	2525	2476	2480	2478	...do	
	C	0							2447	2437	*2415	2442	...do	
	C	0							2524	n. r.	2502	2513	...do	
	C	0							2467	2444	n. r.	2456	...do	
April 14	M 1	0	29.91	66	60	63	↓	12	2424	*2408	2427	2426	...do	
	M 1	0							n. r.	2415	2427	2421	...do	

TABLE 1.—*Firing for velocity, 6 mm.*—Continued.

Date.	Barrel.	Elevation.	Barometer.	Thermometer.			Wind.		Chronographs.				Impact.	Remarks.
				At-tached.	Wet.	Dry.	Direction.	Force.	A.	B.	C.	Mean.		
		°												
	M 1	0	.....	.....	.....	.....	.....	.....	n. r.	2511	2505	2508	Oblique.	
April 16	M 1	0	30.04	72	60	70	Calm ...	0	2473	2473	2469	2472		Bullet tumbled or wabbled badly.
April 20	M 1	0	29.98	76	66	76		3	2483	2473	2396	2484	Oblique.	
	M 1	0	.....	.....	.....	.....	.....	.....	2480	n. r.	n. r.	2480	...do	
	M 1	0	.....	.....	.....	.....	.....	.....	*2542	2490	2496	2493	...do	
	M 1	0	.....	.....	.....	.....	.....	.....	2476	2473	*2490	2475	...do	
	M 1	0	.....	.....	.....	.....	.....	.....	2402	2402	2399	2400	...do	
	M 1	0	.....	.....	.....	.....	.....	.....	2460	2460	2476	2467	...do	
April 16	M 5	0	30.04	72	60	70	Calm ...	0	2460	n. r.	n. r.	2460	...do	
	M 5	0	.....	.....	.....	.....	.....	.....	2450	2453	n. r.	2452	Normal.	
April 17	M 5	0	30.08	72	64	69	Calm ...	0	2500	2496	*2473	2498	Oblique.	
	M 5	0	.....	.....	.....	.....	.....	.....	2428	2444	2460	2444	...do	
			29.88	76	66	76		3	2408	n. r.	2407	2408	...do	
April 20	M 5	0												
	M 5	0	.....	.....	.....	.....	.....	.....	2467	2473	n. r.	2470	...do	
April 23	M 5	0	30.01	66	58	60		5	2466	*2388	2440	2453	...do	Struck wood of screens.
	M 5	0	.....	.....	.....	.....	.....	.....	n. r.	n. r.	2538	2538	...do	
	M 5	0	.....	.....	.....	.....	.....	.....	n. r.	2424	2440	2432	...do	
	M 5	0	.....	.....	.....	.....	.....	.....	*2344	2378	2387	2383	...do	

In the tables the direction of the wind is given with reference to the line of fire considered from left to right; and the force is estimated in miles per hour. The instruments registered in the order A, C, B. N. r. means that no record was obtained for that shot. This was caused by the bullet striking one screen and missing another; to passing between the wires of the screens; or to some fault in the chronograph itself. Where one instrument records a marked difference from the mean of the other two, the record of that instrument is disregarded. These are marked with asterisks (*). Nearly all of the bullets struck the blotting paper obliquely, that is, with the axis inclined to the normal at point of impact.

Ten rounds were fired from the rest, afterwards used in experiments for accuracy, and the jump found to be + 12 feet 40 inches.

The ammunition loaded by measure not having been received on April 23, experiments were begun on the range to determine accuracy and penetration. A range of 1,000 yards was laid off, running northeast and southwest, the target being at the northeast end on a bluff at the edge of the river. A trench was dug, the earth thrown up at the far end, and a frame 6 feet square and 5 feet 10 inches deep placed in front. In the frame were placed twelve rows of white pine boards, 1⅜ inches thick and 1 inch apart. In front of all was mounted an Army C target, 12 by 6 feet, on a frame covered with thin sheeting. At the firing end of the range a platform, 8 by 12 feet, was built, raised 8 feet 6 inches from the ground to clear a knoll intervening between the ends of the range. To this would be added the height of the muzzle from the platform, so that the line from muzzle to center of target was inclined to an angle of 15′ above the horizontal. The firing for accuracy was begun with ammunition from the 260 rounds first received, using a rest, and firing from the shoulder. Very little difficulty was experienced in getting the sights adjusted to the range, only two shots being necessary. After each shot the gun was cleaned as before, the cartridges also being gauged. As in the velocity work, the direction of the wind is given with reference to the line of fire from left to right, and its force estimated in miles per hour. The errors are noted with reference to center of bull's-eye, "+" laterally, meaning to right; and "+" vertically, meaning above. The deviations in passing through the boards are also noted, "+" laterally, meaning a drift to the right, "+" vertically, meaning a rise, reckoning from the projection on the last board struck of the impact on the first board, as origin. The impacts are drawn, the circle showing the impact, and the loop the direction in which the bullet wabbled. Only the hits are recorded. The penetrations given are for the point of the bullet.

The rifles so far behave very well, though barrel M 1 is not so accurate as A or M 5. The recoil is easy, unless the body is rested firmly, when it becomes rather sharp. There have been so far no hang fires or failures to explode of the cartridges. The report is sharp, and can be heard at a greater distance than the service .45-caliber rifle. The powder is almost smokeless, a faint bluish puff, barely noticeable, and indistinguishable at a greater distance than 800 yards. The barrel becomes uniformly fouled in the bore, the fouling being easily removed with a piece of waste soaked in oil. The bullet makes little or no noise when passing within a few feet of the observer's head, a faint "s-s-s-t" being the only sound noticeable. On recovering the bullets from the wood, after penetrating, their dimensions seemed unchanged, being neither set up nor swelled. The rifling takes on the bullets for about three-fourths of their length

usually, and marks of the erosion of gas can be seen on the surface of the soft steel. On striking sand, when firing for velocity, the lead bursts through the point of the bullet and leaves the steel envelope rolled back and distorted a few inches deep in the sand.

Up to the present time there have been fired from A barrel 44 rounds, from B barrel 13 rounds, from C barrel 40 rounds, from M 1 barrel 81 rounds, from M 5 barrel 49 rounds, without any signs of weakness or change of dimensions in any of them. They have all been chambered-gauged and the drop-plug dropped through them without developing any defects. The ammunition (1,000 rounds, loaded by measure) has been received, and the determination of velocities with that ammunition will next be undertaken.

Very respectfully,

N. A. McCULLY,
Ensign, U. S. Navy.

TABLE 2.—*Experiments for accuracy and penetration, 6 mm.*

Date.	Barrel.	Angle of departure.	Barometer.	Thermometer.			Wind.		Error.		Deviation in penetration.		Impact.	Penetration.	Remarks.
				Attached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.	Lateral.	Vertical.			
		° ′ ″							″	″	″	″		″	
April 23	A	57 40	30.05	66	58	60		4	+80	+12					
	A	57 40						5	+5	+16					
	A	57 40						5	+32	−29					
	A	57 40						5	−24	+8½					
April 25	A	57 40	30.17	64	57	62		4	Missed.						Cartridge case split longitudinally, slight gas leak.
	A	57 40						4	−46	−10					
	A	57 40						4	+9	+31				10¼	
	A	58 30						3	−14	+15				11	Bullet shook out between eighth and ninth board.
	A	58 30						3	+13	+21				11	
	A	58 30						3	−4½	+19				10	
	A	58 30						3	+8	+¼				11¾	
	A	58 30						3	−14	+7				8½	
	A	58 30						2	−20½	+6				9⅝	
	A	58 30						2	+8	+10½				9¼	Ordinate at 100 yards=70.4 inch.
April 26	M 5	57 40	30.06	74	61	72		4–5	−26	−10½				12	
	M 5	57 40						3–4	−34½	−11½				12	
	M 5	57 40						4–5	+23½	+26½	+2¾	−2½		9⅝	

TABLE 2.—*Experiments for accuracy and penetration, 6 mm*—Continued.

Date.	Barrel.	Angle of departure.	Barometer.	Thermometer.			Wind.		Error.		Deviation in penetration.		Impact.	Penetration.	Remarks.
				At tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.	Lateral.	Vertical.			
		′ ″							″	″	″	″		″	
April 26	M 5	57 40						4	−30	+20½	+3⅞	−1		11	
	M 5	57 00						4–5	−11	+19¼	+½	−1⅛		11	
	M 5	57 00						4–5	−15¾	+11⅛	+2¼	−3		9⅞	
	M 5	57 00						5–6	−30¾	+6⅛	−1⅛	+½		7	
	M 5	57 00						3–4	−12	±0	−¾	+⅛		11	
	M 1	57 40						3–4	+1½	−24⅛	+1¾	+¾		9⅞	
April 27	M 1	57 40	30.03	64	70	72		4–5	+16	+14¾	+¼	+1¼		10⅞	
	M 1	57 40						4–5	−22	+19¾	−1¾	0		3¾	Bullet wabbled badly.*
	M 1	57 40	30.03	64	70	72		4–5	−6	−20⅛	+5¼	− 1⅛		10⅛	
	M 1	57 40						4–5	+36	+0	0	−¾		5⅛	Bullet wabbled badly.
	M 1	58 00						4	+51	−31⅛					Did not strike boards.
	M 1	58 00						3	+30	−12⅛	−4⅛	−¼		10	
	M 1	59 00						3	−13¼	−14	+4⅛	−1⅛		10	
	M 1	59 00					Calm	0	−17¼	+17⅛	+5¾	0		12⅞	

April 28	M 1	57 30	30.00	71	84	79			2	+32½	−31	.....	.....		.....	Do.
	M 1	57 30	.....	.....	.....	.....			2	+40	−38½	.....	.....		.....	Do.
	M 1	57 30	.....	.....	.....	.....			2	+60½	−26	.....	.....		.....	Do.
	M 1	57 30	.....	.....	.....	.....			2	+38½	+1	.....	.....		.....	Primer of cartridge fell out on opening breech; slight gas leak.
	M 1	57 30	.....	.....	.....	.....			2	+21	−8	+10⅜	+⅞		10⅜	

* This bullet keyholed an impact three-fourths inch long and lodged in the third board, striking this board with full length, making an impact 1½ inches long. Bullet recovered from wood, and rifling found to have taken very lightly. Calipered the bullet and found maximum diameter = 0.238 inch. The braces include five shots fired consecutively. After penetrating the first board, the bullet keeps a constant direction without wabbling.

TEST OF 6-MM. RIFLE BARRELS.

[Memorandum No. 2, for the inspector of ordnance.]

NAVAL PROVING GROUND,
Indian Head, Md., May 15, 1894.

Experiments to determine velocities with ammunition, charges loaded by measure, from the 1,000 rounds received April 30, from the Winchester Repeating Arms Company. Three chronographs were used, distance from muzzle to first screen 17.5 feet, screens 98 feet 5 inches apart, or 30 meters. Screens rigged with same sized wire as in previous experiments for velocity—blotting paper to mark impacts, cartridges gauged as before, and barrels cleaned similarly. The results are given in Table 3.

On May 4, a 6.5-mm. Mannlicher rifle, No. 8735, model 1892, manufactured at Steyr in 1893, also 1,000 rounds 6.5-mm. ammunition, manufactured by Keller & Co., 1893, were received; and experiments were made to determine the velocity with this rifle, using same screens and distances as were used with the 6-mm. barrels. The results from these experiments are also included in Table 3. As before, the force of the wind is estimated in miles per hour, the direction given with reference to line of fire from left to right, and the instruments registered in the order A, C, B. N. r. means no record obtained with that instrument; and an asterisk (*) that the observation so marked is believed to be unreliable.

In determining velocities with the chronographs, the bullet cuts 3 screens or probably 6 wires before the first chronograph records, 4 screens or probably 8 wires before second records, and 5 screens or probably 10 wires before last chronograph records. To ascertain if cutting these additional wires diminished the velocity, 10 observations were made using only 2 screens and 1 chronograph, and compared with the velocity obtained with same ammunition from the same barrel. The chronograph used was chosen as giving, generally, the most trustworthy observations, and the screens were rigged in the same way and at the same distances. The results compared closely; but due to 1 observation of 2,306 foot seconds, which might be considered abnormally low, the mean of the velocities with 1 chronograph was below that obtained with 3. Another round was fired, which, if substituted for the very low velocity, would give a mean within 1 foot second of the mean with 3 chronographs. These results are also found in Table 3. The impacts on the blotting paper are marked by small circles of approximately the same size as the bullet, the loop showing the direction of the wabbling, with an approximation to its extent.

Experiments were also made on the 1,000-yard range in continuation of those reported in memorandum No. 1, to determine accuracy and steadiness of flight. The firing was conducted in same manner as that done previously. The results are given in Table 4.

In the experiments with the Mannlicher rifle, so far, the gun has behaved very well. It is fitted with the notch and leaf rear sight, graduated to every 100 meters up to 2,000 meters. The front sight resembles the sight of the Springfield or Hotchkiss rifle. The firing at 1,000 yards was done using elevation for 900 m., and taking a half sight. The recoil is about the same as the 6 mm., and the barrel heats with about the same quickness. The report is just about as loud as that of the 6 mm., and amount and appearance of smoke very nearly the same. The

rifling takes deeper in the bullet and for a greater length. The maximum diameter of the bullet before firing is 0.2618 inch, the maximum after firing 0.2675 inch, the minimum 0.2572 inch. The bullet does not seem to wabble but very slightly at short ranges; but at 1,000 yards it shows, if anything, more wabbling than the 6 mm. bullet.

As a comparison between the steadiness of flight of the 6 mm. bullet and 6.5 mm. Mannlicher, at a distance of 100 feet from the muzzle, six blotting paper screens were set up one behind the other, and 2 feet 9¾ inches apart, the bull's-eyes as nearly as possible in the same line from the muzzle. Five shots each were then fired alternately from barrel B and the 6.5 mm. Mannlicher and the results noted. These screens are inclosed with this memorandum. 6 mm. bullet No. 2 struck wood of target (3) and tumbled. The numbers underscored represent the impacts of the Mannlicher 6.5 mm.

About two hundred measurements of the diameters of the 6 mm. bullets were made, measuring with the micrometer calipers close to the mouth of the case, and the mean found to be 0.2400 inch, varying between the extremes of 0.2389 and 0.2408 inch. Five bullets of the smaller and five bullets of the larger diameter were then fired alternately at a blotting paper target placed 100 feet from the muzzle. This target is also inclosed.

6 mm. barrel B.	Diameter of bullet.	6 mm. barrel B.	Diameter of bullet.
	Inch.		*Inch.*
Round 1	0.2404	Round 6	0.2391-0.2397
Round 2	.2391	Round 7	.2407
Round 3	.2404	Round 8	.2390
Round 4	.2389	Round 9	.2405
Round 5	.2405	Round 10	.2398

None of the barrels have shown any signs of well-defined deterioration of change. In trying the chamber gauge in barrel C after 71 rounds had been fired from it, the gauge seemed to rebound a little when thrown into the chamber with a little force. No change in dimensions can be observed from the outsides of the barrels.

A box of empty cases is forwarded by same mail containing the case in which the blow-back occurred, nine others in which there were gas leaks about mouth or primer, or both, and ten others that were split, some of them in practice firing. The case which is split from mouth to one-half inch from rim is the one noted in the first memorandum. It is marked by a file mark across the head. Some of the bullets, both 6 mm. and 6.5 mm., are inclosed in same box with cases. They are numbered by file marks across the body.

The 6 mm. No. 1 was never fired; 6 mm. No. 2 tumbled, struck target, and penetrated 3½ inches; 6 mm. No 3 struck ground, ricochetted and struck target, penetrated 2 inches; 6 mm. No. 4 flew normally, and penetrated 10⅛ inches; 6 mm. No. 5 wabbled badly and penetrated 7 inches. The other 6 mm. underformed bullets were fired at the wood target at 1,000 yards, and flew normally.

The deformed 6 mm. bullets were some of those that were fired for velocity and struck in sand butt. Those with points underformed struck frames of screens and tumbled before striking sand.

The 6.5 mm. bullets were fired at wood targets at 1,000 yards, and flew normally, penetrating from 10 to 10⅞ inches.

There are now fired from A barrel 101 rounds; from B barrel 88 rounds; from C barrel 104 rounds; from M 1 barrel 120 rounds; from M 5 barrel 89 rounds, and from the Mannlicher 49 rounds.

The velocity observations by weight and measure of the first series in programme being completed, also the experiments for steadiness and accuracy by weight and measure for 1,000 yards, the next experiments to be undertaken will be those for determining the trajectories for 1,000 yards, and the drift. After that the firing station will be moved up to 500 yards, and experiments begun at that range.

Very respectfully,

N. A. McCULLY,
Ensign, U. S. Navy.

TABLE 3.

Date.	Barrel.	Ammunition.	Elevation.	Barometer.	Thermometer.			Wind.		Chronographs.				Impact.	Remarks.
					Attached.	Wet.	Dry.	Direction.	Force.	A.	B.	C.	Mean.		
May 3	A	Ammunition by measure from 1,000 rounds received April 30, from Winchester Repeating Arms Co.	Level	30.16	79	73	78	↙	1-2	2421	2427	2444	2431	○	
	A									2449	2444	2466	2453	Oblique.	
	A									2362	*2406	2371	2367	...do....	
	A									2362	2356	*2284	2359	...do....	
	A									n. r.	2371	2347	2359	...do....	
	A									n. r.	2437	2424	2431	...do....	
	A									2390	2396	*2344	2398	...do....	
	A									2353	2353	*2332	2346	...do....	
	A									n. r.	2390	2393	2392	...do....	
	A									2318	2312	2304	2311	...do....	
	C		Level	30.12	82	73	79			2384	2362	2384	2377	Normal.	
	C									2387	n. r.	2381	2384	Oblique.	
	C									2415	2412	2424	2417	...do....	
	C									2353	2353	2353	2353	...do....	
	C									2321	2315	2306	2314	...do....	
	C									2295	2295	n. r.	2295	...do....	
	C									2359	2359	2350	2356	...do....	
	C									2402	*2476	2396	2399	...do....	
	C									Missed.				◇	
	C									2292	2287	n. r.	2290	Oblique.	
	C									2368	2368	2368	2368	...do....	
May 4	B		Level	30.11	71	65	67	↘	2	n. r.	n. r.	2456	2456	...do....	
	B									2424	2431	2431	2429	Normal.	
	B									2412	2421	2415	2416	...do....	
	B									2408	2424	2434	2422	Oblique.	
	B									n. r.	*2284	*2287		...do....	Blow-back through primer and gas leak.
	B									n. r.	2497	2500	2499	...do....	
	B									2318	2323	2318	2320	...do....	
	B									2507	2521	2525	2518	...do....	
May 7	B		Level	29.93	83	69	82			n. r.	n. r.	2440	2440	...do....	Struck wood of Reg. A.
	B									2473	2466	2456	2465	...do....	
	B									2405	2412	2412	2413	...do....	

TABLE 3—Continued.

Date.	Barrel.	Ammunition.	Elevation.	Barometer.	Thermometer. Attached.	Thermometer. Wet.	Thermometer. Dry.	Wind. Direction.	Wind. Force.	Chronographs. A.	Chronographs. B.	Chronographs. C.	Chronographs. Mean.	Impact.	Remarks.
May 7	M 5	Ammunition by measure from 1,000 rounds received April 30 from Winchester Repeating Arms Co.	Level	29.92	84	70	82	↘	2	n. r.	2315	n. r.	2315	...do	
	M 5									2450	2450	2463	2454	...do	
	M 5									2312	* 2303	2312	2312	...do	
	M 5									2321	2309	2332	2321	...do	
	M 5									2402	2396	2387	2395	...do	
	M 5									2362	2368	2362	2364	...do	
	M 5									2324	* 2387	2321	2323	...do	Gas leak around primer.
	M 5									2312	2315	* 2353	2314	...do	
	M 5		Level	29.92	84	70	82	↘	2	2440	2428	2431	2433	Normal.	
	M 5									2368	2362	2368	2363	Oblique.	
	M 5									2381	2381	2386	2383	...do	
	M 1		Level	29.92	84	74	83	↘	6	2402	n. r.	2418	2410	...do	
	M 1									n. r.	2374	n. r.	2374	Normal.	
	M 1									2456	2378	2365	2372	Oblique.	
	M 1									2374	2374	2368	2372	...do	
May 8	M 1		Level	29.94	75	61	72	→	2–3	2490	2490	2525	2490	...do	
	M 1									2390	2390	2396	2392	...do	
	M 1									2332	2327	2338	2332	...do	
	M 1									2405	2393	2415	2404	...do	
	M 1									2463	2470	2476	2470	...do	
	M 1									2440	2434	2447	2440	...do	
May 9	M 1		Level	29.01	80	72	80	→	2–3	2387			2387	...do	
	M 1									2396			2396	...do	
	M 1									2447			2447	...do	
	M 1									2387			2387	...do	

	M 1									2393			2393	...do	
	M 1									2338			2338	...do	
	M 1									2415			2415	...do	
	M 1									2306			2306	...do	
	M 1									2444			2444	Normal.	
	M 1									2437			2437	Oblique.	
	M 1									2405			2405	...do	
May	Mann. 6.5 mm.	Keller & Co. '93.	Level...	29.94	75	61	72	→	2-3	n. r.	2347	2393	2393		Struck wood of Reg. C.
	Mann. 6.5 mm.									2381	2387	2390	2386	Normal.	
	Mann. 6.5 mm.									2356	2362	2365	2361	...do	
	Mann. 6.5 mm.									2332	2333	2327	2331	Oblique.	
	Mann. 6.5 mm.									2365	2456	2463	2461	Normal.	
	Mann. 6.5 mm.									2399	2396	2390	2398	...do	
	Mann. 6.5 mm.									2390	2402	*2444	2401	Oblique.	
	Mann. 6.5 mm.									2408	2405	2393	2402	Normal.	
	Mann. 6.5 mm.									2381	2384	n. r.	2383	...do	
	Mann. 6.5 mm.									2428	2418	2431	2426	...do	

TABLE 4.

Date.	Barrel.	Ammunition.	Angle of projection.	Barometer.	Thermometer.			Wind.		Error.		Deviation in penetration.		Impact.	Penetration.	Remarks.
					At-tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.	Lateral.	Vertical.			
			′ ″							″	′	″	″		″	
May 2	C	Ammunition by weight (260) received April 12.	57 40	30.08	80	76	84	↘	2	+15	+7	+3	−1½	○	9⅝	
	C		57 40							+40	−26					Missed boards.
	C		57 40							−½	+14¼	+2¾	+½	○	12½	
	C		57 40							−2	−6	−2¼	−1½	○	11¼	
	C		57 40							+4¾	−9¾	+4½	+1	○	11½	
	C		57 40							+18	−1¼	−2¾	+2½	○	11	
	C		57 40							−11½	+4	−2	−2½	○	10⅞	
	B		57 40					↗	2-3	−11	+17	0	−3	○	12⅞	
	B		57 40							−28	+31	+3¼	−1¼	○	13½	
	B		57 40							−22	+12½	−2	+1¾	○	11¾	
May 3	B		57 00	30.16	79	73	78	↘	2	−33½	+14½	+5	−3	○	11¼	
	B		57 00							−18	−21	+1¼	+½	○	12	
	B		57 00							−17	+21	+2	−⅞	○	10½	
	B		57 00							+31	+31½	−2	+¾	○	11½	
	B		57 00							+31	−4	+2¾	+½	○	10⅝	Slight gas leak around primer.
	B		57 00							+52	+15½					Missed boards.
	B		57 00							+28	+15½	−3¾	−3	○	11	
	B		57 60							+36	+40					Struck frames of target.
	B		57 60							+32	+10					Struck in cracks of boards.

May 9	A	Ammunition by measure received	59 00	30.13	70	58	72	↙	1-2	−40	−32½						Missed boards.
	A		59 00							−12	−20	−4	−1½	○	10½		
	A		59 00							+18	−31½	−1⅜	−2	○	9⅜		
	A		59 00							−7½	−13	+4¼	+¾	○	9⅞		
	A		59 00							+8	+5	+2	+1	○	10⅛		
	A		59 00							−45¼	−23½						Do.
May 10	A		59 00	30.27	72	65	75	↙	3	+15½	−5	+2	+2¼	○	10⅞		
	A		59 00							+18½	+6	0	−¾	○	9¼		
	A		59 00							+16½	−15	−½	+1¼	○	10⅝		
	A		59 00							+9½	−34	+2¼	+1⅞	○	9¼		Slight gas leak around primer.
	A		59 00							+14½	−11	+3¾	−½	○	10⅞		
	A		59 00							+64½	+2						Missed boards.
May 9	Mann.	Keller & Co., '93.	m. 900	30.13	70	58	72	↙	1-2	+32½	+31½	+2¼	+½	○	'0⅝		Gas leak around mouth of case as far as slope
	Mann.		900							+25	−4¼	+1½	+1¼	○	10½		
	Mann.		900							+46	+7½						Missed boards; gas leak around mouth as before.
	Mann.		900							+42½	−14						Do.
May 10	Mann.		900	30.27	70	58	72	↙	3	+23¾	+7	+2	−1½	○	8¾		Gas leak at mouth
	Mann.		900							+12½	−16	−2	−1¾	○	9⅞		Do.
	Mann.		900							+35½	−33						Struck frames.
	Mann.		900							+26¼	+16	−2¾	+¾	○	10⅝		
	Mann.		900	30.27	70	65	75	↙	3	+17½	+15½	+1½	−1	○	10⅝		Gas leak about mouth of case.
	Mann.		900							+30¾	12½	−2	+¾	○	10¾		Do.
	Mann.		900							+1	+22	−2¾	−1	○	10⅞		Do.
	Mann.		900							+5	−3½	+½	+1¾	○	10⅞		

TABLE 4—Continued.

Date.	Barrel.	Ammunition.	Angle of projection.	Barometer.	Thermometer.			Wind.		Error.		Deviation in penetration.		Impact.	Penetration.	Remarks.
					At-tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.	Lateral.	Vertical.			
			′ ″							″	″	″	″		″	
May 9	M 5	Winchester Repeating Arms Company.	58 00							+22	+36				9½	Case split.
	M 5		58 00							−16½	−17½	+3	−1		11¼	Gas leak about primer.
	M 5		58 00							−28	−32	−1	+2		3½	Case split.
	M 5		58 00							−6½	+1	−2¼	0		8¾	Gas leak about primer.
	M 5		58 00							−34¾	+21¼	+3½	+2		11¾	
	M 5		58 00						2	−7¼	−30½	+2½	−1½		9¼	
	M 5		58 00							−20	−¾	+2	−¾		8¾	
	M 5		58 00							−10	+18½	−3	−½		11¼	
	M 5		58 00							−13½	+5½	+1¼	0		9	
	M 5		58 00							−12½	−9¼	+5¾	−1¼		10½	
	M 5		58 00							−54	+1½					Bullet tumbled, ricochetted and struck target.
	M 1		58 00						4-5	−5	−40					Missed boards.
	M 1		58 00							−17¾	−14	+2¼	+⅜		12½	
	M 1		58 00						2	−12	−34	−2¼	−2½		10¼	
	M 1		58 00						3	−17½	−23½	−3½	+¼		10⅝	
	M 1		58 00							−8	−39½					Missed boards.
	M 1		58 00							−10¼	−9¾	+3¾	+¼		10⅞	

	M 1...	Ammunition by measure received April 30 from	58	00	.....	.....	.....	.....	.....	.....	−6½	−10½	.....	.....		.....	
May 11	C		59	00	30.32	70	64	60		3	Missed.		.....	.....	.....	.....	Case split.
	C		59	00	.....	.....	.....	.....		2-3	+1	−40	.....	.....	.....	.....	Gas leak about primer and mouth of case.
	C		59	00	.....	.....	.....	.....		2	+5½	−¾	+1	−¼		9½	
	C		59	00	.....	.....	.....	.....		2-3	+4½	−17½	+1	+¼		10½	
	C		59	00	.....	.....	.....	.....	Calm ...	0	−19½	−13½	+3	0		12¼	Struck between boards.
	C		59	00	.....	.....	.....	.....	.....	.....	+3½	+19½	+4	0		12¼	
	C		59	00	.....	.....	.....	.....	.....	.....	+1½	−10½	−4½	−½		10⅝	
	C		59	00	.....	.....	.....	.....	.....	.....	+17½	+23½	+¼	−1½		12½	
	B		59	00	.....	.....	.....	.....		1-2	+20	−14	+¼	−¾		9⅞	
	B		59	00	.....	.....	.....	.....	.....	.....	+19½	− 2¼	−2½	−3		11¼	
	B		59	00	.....	.....	.....	.....	.....	.....	+8¾	−14⅞	+4½	−1½		10⅞	
	B		59	00	.....	.....	.....	.....	.....	.....	+19½	−20	+½	+¼		2½	
	B		59	00	.....	.....	.....	.....	.....	.....	+2½	−30	.....	.....		.....	
	B		59	00	.....	.....	.....	.....	.....	.....	+6½	+25	−2	−1½		11¼	

TEST OF SMALL-ARM RIFLE BARRELS.

[Memorandum No. 3 for the inspector of ordnance.]

NAVAL PROVING GROUNI
Indian Head, Md., June 25, 1

Determination of trajectory for 1,000 yards: A hoisting fram used, on the upper end of which were two sheets of blotting p The frame set up at 100 yards was aligned by the theodolite. The ting paper was given a hoist of about the required distance an line of sight carried to the uprights of the frame. A number of were then fired at the elevation for 1,000 yards, and the mean c records taken as the ordinate for 100 yards of the 1,000-yard traje The frame was then shifted to each of the other hundred-yard r and the ordinates determined similarly for them; the trajectories 6 mm. with ammunition by weight and measure, and the trajecto 6.5 mm. Mannlicher were determined.

Determination of the trajectory for 500 yards: Nine screens made, fitted with tissue paper, and set up at each 50 yards betw and 500 yards. They were aligned by the theodolite and the int tion of the line of sight with each one marked by a black paster were fired through at the same time, and the means of the ord used to determine the trajectory.

Owing to the presence usually of more or less wind on the rang to its marked effect on the lateral error of the bullets, only ap mate observations could be made for the drift. These observ include also the error due to the angle of vibration, which has n been determined.

The angles of fall were found by placing a tissue-paper screen f in front of the paper target and firing so as to strike both.

The trajectories determined are plotted and inclosed herewith. ranges are to the scale 1:3600, and the ordinates to the scale 1: purposes of better definition.

Experiments were made to determine accuracy and penetrat each barrel with each kind of ammunition at 500 yards. The firin carried on in the same manner as that done at 1,000 yards, using th rest, but firing at an Army B target. The impacts on the woo all nearly normal, so that it was not easy to determine to whic the bullets had wabbled.

The penetration was usually in a prolongation of the trajectory, the angle of impact were markedly oblique. As the bullets near end of their paths they would deviate somewhat without followi regular rules, sometimes there being a double inflection in this p the path. On being recovered, the bullets were apparently not injured than when fired at 1,000 yards. The results of this firi included in Table 5. Included in the same table are the results shots, with different barrels and ammunition, fired at a distance feet from the boards, arranged as in previous penetration tests this range the impacts from the slower-pitch 6 mm. were near oblique; those of the quick-pitch 6 mm. and Mannlicher were n Some of the bullets, on being recovered after having penetrated t nine boards, were found to have the point flattened and to be ver too hot to be picked up by hand; and in several bullets the lea melted and part of it forced out at the base. The path in the was usually straight.

A sufficient number of rounds were fired from each barrel to

0 from each, when they were dismounted and examined with follow-
g results:

Barrel A.—Thoroughly cleaned and weighed, weighing 3.2 grams
ss than when first weighed before beginning test.

Examined with bore reflector, and found chamber rifling and bore in
ood condition. Slight signs of wear at origin of rifling.

Tried chamber gauge. Holding barrel horizontally and throwing
auge in, it would rebound clear of gun.

Tried drop plug. Holding barrel horizontally, this could be driven
ear through the barrel by a quick blow.

The outside dimensions of the barrel were unchanged.

Forced lead plug, calipering 0.245 inch, through barrel from cham-
er to muzzle. Forced steadily without sticking or slipping and recov-
ed, calipering 0.240 to 0.237 inch. Rifling not well defined on plug.

Barrel B.—Thoroughly cleaned and weighed, weighing 2.9 grams
ss than when first weighed.

Examined with bore reflector. The rifling generally appeared in good
ndition. Slight signs of wear at the origin. A fine transverse crack
as noticed about 4 inches from origin of rifling, running over one land
d about one-third of the way around the bore. A shorter one appeared
the other side of the bore.

Tried chamber gauge. Holding barrel horizontally and throwing
ge in, it would rebound clear of gun.

Drop plug could be driven from end to end by a quick blow.

Forced lead plug through, going steadily, without sticking or slip-
g. Recovered, calipering 0.239 to 0.236 inch. Rifling not well defined.

Empty cases of cartridges fired from barrel B would enter very nearly
ne in chamber gauge template, and could be forced in with a little
iculty.

The outside dimensions remain unchanged.

Barrel C.—Thoroughly cleaned and weighed, weighing 0.5 grams
s than at first.

With bore reflector, rifling showed slight signs of wear. At the
gin scores were noticed with a greater pitch than the rifling, as
made by bullets slipping the rifling; a bruise about one-fourth inch
g and extending all around bore 6 inches from muzzle.

Chamber gauge fitted loosely. Empty cases of cartridges fired from
rel C would not go home in template, sticking about one-half inch
. Turning the case around in the template, an abrasion was made
the case five-eighths inch from the rim.

Drop plug passed through easily.

Forced lead plug through barrel from chamber to muzzle. Plug
ck a little about 8 inches from origin of rifling. Issued rubbed
oth, with no marks of rifling, and calipering 0.236 inch. Another
g tried gave the same result.

Outside dimensions of the barrel were unchanged.

Barrel M 1.—Thoroughly cleaned and weighed; weight same as
fore testing.

With bore reflector, no signs of wear could be detected.

Chamber gauge fitted neatly. Cases fitted template fairly.

Drop plug passed through easily.

Lead plug forced through without sticking or slipping. Recovered,
th rifling well defined, and calipering 0.241 to 0.237 inch.

Outside dimensions of the barrel were unchanged.

Barrel M 5.—Cleaned and weighed; weight, 1.3 grams less than at
st.

With bore reflector, signs of wear could be noticed at origin, also evidences of bullets slipping the rifling.

Chamber gauge rebounded from barrel when thrown in horizontally. Cases fitted template fairly.

Drop plug passed through easily, but could not be driven through by a blow, as before.

Lead plug forced through without sticking or slipping and recovered; rifling fairly well marked, and calipering 0.240 to 0.237 inch.

Outside dimensions of barrel unchanged.

Barrel No. 5150.—Cleaned and weighed; weighed 0.7 gram less than before test.

Examined with bore reflector; little or no signs of wear.

At the origin appeared evidences of bullets having slipped the rifling.

Chamber gauge fitted similarly to A and B, rebounding on being thrown in. Cases of cartridges fired from this gun fitted template fairly well.

Drop plug went through smoothly.

Lead plug forced through, going a little harder than with other barrels, but steadily, without sticking or slipping.

Recovered; rifling clearly marked, and calipering 0.240 to 0.236 inch.

Outside dimensions of barrel unchanged.

Mannlicher.—Examined with bore reflector; the bore and chamber appeared in good condition.

Lead plug measuring 0.270 inch was forced through, going steadily without slipping or sticking, and recovered; rifling clearly marked, calipering 0.267 to 0.256 inch.

The barrel had not changed in dimensions.

Five rounds were fired from each barrel with each kind of ammunition to determine velocity after endurance test. Results in Table 6.

Received on May 16, 740 0.236-inch cartridges from Winchester Repeating Arms Company without information as to method of loading. This makes altogether 5,000 rounds received, and allows less than 1,000 rounds for the test of each barrel of this caliber.

Received May 22 a graduated peep sight complete, with which a few experiments for accuracy have been made.

Received June 7 another barrel, No. 5150, of 6-mm. caliber, from Ensign A. C. Dieffenbach, U. S. Navy, inspector of ordnance at Hartford, Conn. This barrel is of Bethlehem plain steel, rifled one turn in 5 inches, mounted similarly to barrels formerly received, and fitted with graduated peep sight. This barrel had been fired eighty-five times before receipt, and has since been tested for velocity, accuracy, and penetration at 500 yards, steadiness in flight, and endurance. In the test for accuracy the telescope sight was fitted as to the other barrels. Testing for steadiness in flight, 70 per cent of the hits were normal up to 300 yards, and from 300 yards to 1,000 yards 50 per cent normal. The oblique hits at 1,000 yards were even more inclined than the usual oblique impacts of the 6-mm. with slower pitch. In firing for accuracy, two bullets were observed to go to pieces in the bore, scattering on leaving the muzzle, some of the pieces of steel envelope striking ground about 200 feet from muzzle. In firing this barrel for velocity one other bullet burst its envelope and struck wood of first screen, 17.5 feet from muzzle, keyholing an impact three-fourths inch long. A large number of gas leaks occurred with this barrel. The recoil from this barrel is considerably stronger than from the other 6 mm. barrels, and in some positions of firing, as lying prone, is disagreeable.

There have been altogether 1,646 rounds fired from the 6-mm. barrels and 264 from the 6.5 mm. Out of these there were 27 split cases, 61 primer leaks, 2 blow backs, 3 evidences of high pressure with hard extraction, 1 hang fire, and 2 missfires. Of these, barrel A had 4 split cases, 8 leaks; barrel B, 5 split cases, 7 leaks, 2 blow backs, 3 evidences of high pressure, and 1 hang fire; barrel C, 5 split cases, 9 leaks; barrel M 1, 1 split case, 6 leaks; barrel M 5, 6 split cases, 9 leaks, and 1 missfire; barrel 5150, 4 split cases, 22 leaks; Mannlicher, all cases leaked about mouth as far as slope, but no primer leaks; 2 cases split from mouth to slope, and there was 1 missfire.

The endurance test will be continued and impacts obtained at 2,000 and 3 000 yards.

Very respectfully,

N. A. McCULLY,
Ensign, U. S. Navy.

TABLE 5.—*Accuracy and penetration; range, 500 yards.*

Date.	Barrel.	Ammunition	Angle of projection.	Barometer.	Thermometer.			Wind.		Error.		Impact.	Penetration.	Remarks.
					At-tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.			
			′ ″							″	″		″	
June 16	M 1	By measure received Apr. 20.	12 40	30.12	68	80	92	↙	2-3	+7¾	−14½		9¾	Struck old bullet in boards.
	M 1		12 40							+10	−15¾		20¾	Gas leak primer.
	M 1		12 40							+8	−19½		22¼	
	M 1		12 40							+12	−19½		22½	
	M 1		12 40							+4¾	−10		23	
	M 1	By weight received Apr. 18.	12 40							+9	−9¾		22	
	M 1		12 40							+8	−12¾		23	
	M 1		12 40							+2	−10¾		23	
	M 1		12 40							+3¼	−12		23	
	M 1		12 40							+3¼	−14		23	
	Mann		Level.							+22¼	−11¾		23	
	Mann									+18½	−9		23	
	Mann									+23¼	−3¼		23	
	Mann									+29½	−4¾		23	
	Mann									+31½	−9½		22½	
June 18	No. 5150	By weight received Apr. 18.	13 00	30.06	74	80	92	↗	3-4	+4½	−16½	Heavy normal.	21¾	
	No. 5150		13 00							−4¾	−6¼		22½	
	No. 5150		13 00							+3½	−25			Missed boards.
	No. 5150		13 00							−4	−9¾		12	Bullet struck another in boards.
	No. 5150		13 00							−4	−14		22½	
	No. 5150	By measure received Apr. 30.	13 00							+1¾	−9		22½	
	No. 5150		13 00							−12¾	−4½		22¾	
	No. 5150		13 00							+¾	+3		27	Struck in old hole.
	No. 5150		13 00							−9½	−10½		23¾	
	No. 5150		13 00							−3¾	+9		23½	
	C	By weight received Apr. 18.	12 40					↗	4-5	+10½	+10½		23½	
	C		12 40							+4½	+20¾			Missed boards.
	C		12 40							0	+13¾		24½	
	C		12 40							+6½	+23¾			Missed boards, primer gas leak.
	C		12 40							+2	+15¾		20¾	

	C	By measure received Apr. 30.	12 40							+20¼	+19⅛		21⅛	Missed boards.
	C		12 40							+15	+23			
	C		12 40							+8	+20¼		23⅛	
	C		12 40							+14	+20			
	C		12 40							+11¾	+21½		24¾	
	M 5		12 40							−4	+16		23⅜	
	M 5		12 40							−9¼	+21⅛		24¾	
	M 5		12 40							−3⅞	+18⅛		23⅞	
	M 5		12 40							−9	+16		25	
	M 5		12 40							−15	+12⅛		24⅜	
June 18	M 5	By weight received Apr. 18.	12 40	30.08	73	78	90	↗	4-5	−26¾	−¾			
	M 5		12 40							−28⅛	+5		24⅜	
	M 5		12 40							−37⅛	+1		21⅜	
	M 5		12 40							−30	+5⅛		22¾	
	M 5		12 40							−35	−6		23	
June 21	A	By measure received Apr. 30.	12 40	30.15	72	76	90	↗	1-2	−9¾	−5			
	A		12 40							−3⅛	−6			
	A		12 40							−6¼	−3⅛			
	A		12 40							−5	+2⅛			
	A		12 40							−8⅛	−2⅛			
	A	By weight received Apr. 18	12 40					↗	0-1	+1⅛	+9⅛	Heavy normal.		
	A		12 40							+1⅛	+9⅛			
	A		12 40							−9	+9⅛			
	A		12 40							−1⅛	+12¼			
	A		12 40							−¼	+10			
	B		14 40							−¼	+18⅛			
	B		14 40							−4¼	+15¼			
	B		14 40							−7	+11			
	B		14 40							−8⅛	+18¼			
	B		14 40							−9	+17			
	B	By measure received Apr. 30.	15 40							+18	+20⅛			
	B		15 40							+12⅛	+14¾			
	B		15 40							+10	+25⅛			
	B		15 40							+26⅛	+25⅛			
	B		15 40							+24⅛	+19¼			
June 11	No. 5150		(75)					↙	3-4	+53¾	−12¾		5⅛	Gas leak primer; range 1,000 yards.

TABLE 5.—*Accuracy and penetration; range, 500 yards*—Continued.

Date.	Barrel.	Ammunition.	Angle of projection.	Barometer.	Thermometer.			Wind.		Error.		Impact.	Penetration.	Remarks.
					At tached.	Wet.	Dry.	Direction	Force.	Lateral.	Vertical.			
			° ″							″	″		″	
June 11	No. 5150	By weight.	(75)							+29	+21		8¼	Poep sight used; range 1,000 yards.
	No. 5150		(75)							+25	—34		8½	Do.
	No. 5150		(75)							+23	—35		9⅛	Do
	No. 5150		(75)							+41	—12			Missed board; gas leak primer.
	No. 5160		(75)							+7¾	—20¼		9⅝	Range 1,000 yards.
June 18	No 5150	Measure		30.10	73	80	88						51¼	Mean of 5 shots at boards 10 inches from muzzle. Some of the 6 mm. bullets mushroomed, beginning to do so between fourth and fifth board.
	M 5	do											53	
	M 5	Weight											54¼	
	Mann.												59½	

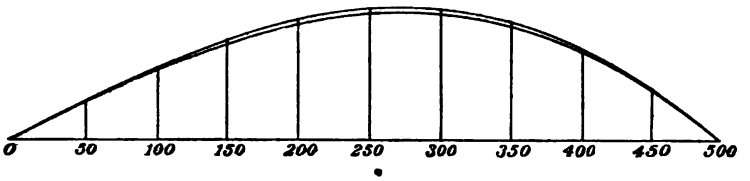
TABLE 6.—*Velocity.*

Date.	Barrel.	Ammunition.	Barometer.	Thermometer.			Wind.		Chronographs.				Remarks.
				Attached	Wet.	Dry.	Direction.	Force.	A	B	C	Mean.	
June 20	A	Weight	30.15	85	74	86	↘	2-3	2405	2405	2408	2406	
	A	do							n. r.	2402	2408	2406	
	A	do							2500	2483	2470	2484	
	A	do							2444	*2341	2446	2145	
	A	do							2402	n. r.	2408	2406	
	A	Measure							2444	n. r.	2444	2444	
	A	do							n. r.	2424	2424	2424	
	A	do							2408	2412	2421	2414	Gas leak primer.
	A	do							n. r.	2374	2390	2382	
	A	do							2424	2421	n. r.	2423	
	B	Weight							2415	2415	2415	2415	
	B	do							2490	2483	n. r.	2487	
	B	do							n. r.	2490	2490	2490	
	B	do							2456	2450	2470	2459	
	B	do							2387	2393	2396	2392	
	B	Measure							2380	2376	2378	2378	
	B	do							2373	*2273	2380	2377	
	B	do							2393	2381	2390	2391	
June 21	B	do	30.15	82	70	88	↓	1-2	2418	2412	2437	2422	
	B	do							2437	2440	2434	2437	
	No. 5150	Weight							2480	2453	2428	2454	
	No. 5150	do							n. r.	2405	2402	2404	Gas leak primer; fell out.
	No. 5150	do							2412	2405	2408	2408	Gas leak primer.
	No. 5150	do							2474	2387	2362	2374	Gas leak primer; split case.
	No. 5150	do							2341	2381	2359	2360	
	No. 5150	do							2338	2344	2332	2338	
	No. 5150	do							2353	2353	*2289	2353	Gas leak primer.
	No. 5150	do							2332	n. r.	2335	2334	Do.
	No. 5150	do							2344	2332	2317	2331	
	No. 5150	do							2408	2408	n. r.	2408	
	No. 5150	Measure							2362	2381	2362	2368	
	No. 5150	do							2456	2447	n. r.	2452	
	No. 5150	do							2424	2412	2421	2419	
	No. 5150	do							2390	2353	2374	2372	Do.
	No. 5150	do							2335	2338	2338	2337	
	No. 5150	do							2353	2356	2347	2352	
	No. 5150	do							2306	2306	2309	2307	
	No. 5150	do							2368	2381	2393	2381	
	No. 5150	do							2368	2368	2356	2364	
	No. 5150	do							2390	2396	2390	2395	

TABLE 6.—*Velocity*—Continued.

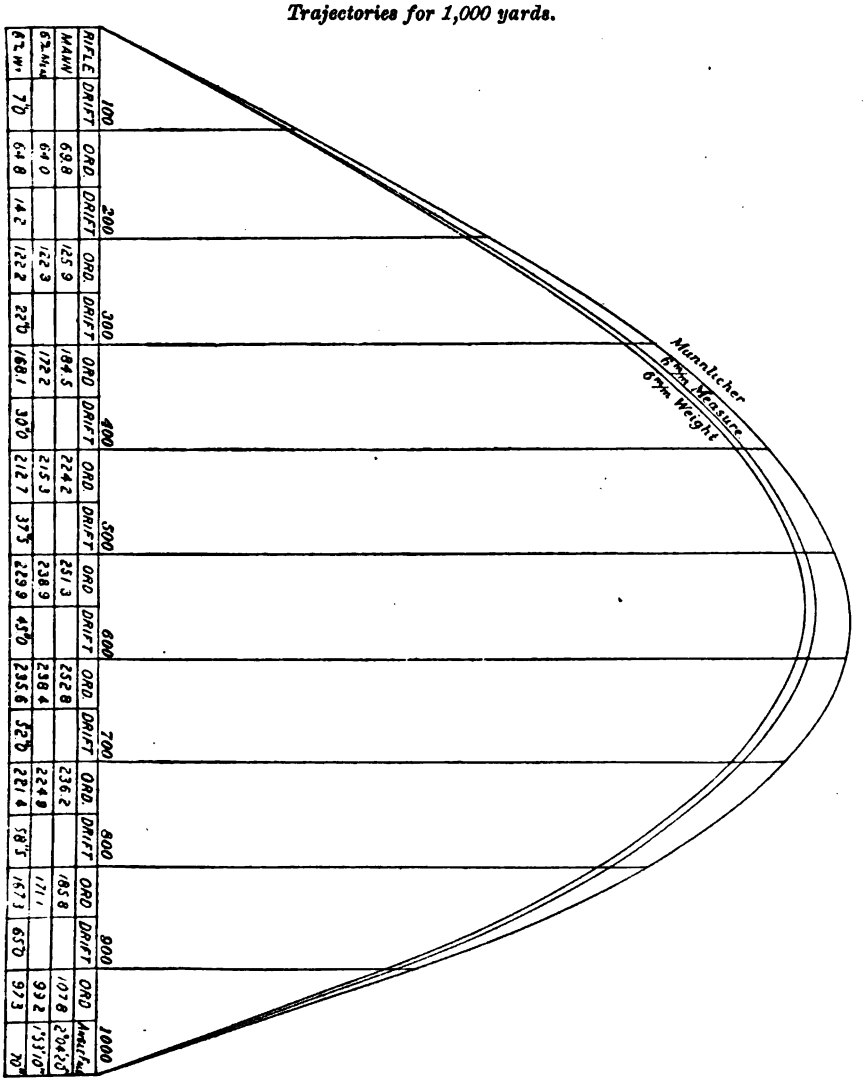
Date.	Barrel.	Ammunition.	Barometer.	Thermometer.			Wind.		Chronographs.				Remarks.
				Attached.	Wet.	Dry.	Direction.	Force.	A	B	C	Mean.	
June 21	Mann		30.15	82	70	88	↙	1-2	2434	2427	2418	2426	
	Mann								2393	2393	2390	2392	
	Mann								2450	2456	2440	2440	
	Mann								2381	2402	2356	2380	
	Mann								2402	n. r.	2390	2401	
	M 5	Weight							2415	2421	2418	2418	
June 22	M 5	do	30.10	80	74	90	↘	1-2	n. r.	2393	2387	2390	
	M 5	do							2356	2356	2362	2358	Gas leak.
	M 5	do							2473	2470	*2440	2472	
	M 5	do							2528	*2714	2518	2523	
	M 5	Measure							2393	2381	2381	2385	
	M 5	do							2378	2381	2381	2380	
	M 5	do							2415	2412	2405	2411	
	M 5	do							n. r.	2384	n. r.	2384	
	M 5	do							2326	2315	2318	2320	
	M 1	Weight							n. r.	2440	2434	2437	
	M 1	do							2428	2424	2421	2424	
	M 1	do							2434	2418	2402	2418	
	M 1	do							2431	2240	2418	2425	
	M 1	do							2490	*2456	2473	2473	
	M 1	Measure							2415	n. r.	2396	2405	
	M 1	do							2447	n. r.	2460	2454	
	M 1	do							2500	n. r.	2493	2497	
	M 1	do							2393	2415	2362	2390	
	M 1	do							n. r.	2350	2362	2356	
	C	Weight							2421	*2524	2415	2418	
	C	do							2431	2434	2428	2431	
	C	do							2381	2399	2386	2389	
	C	do							2400	2408	*2525	2404	
	C	do							2376	n. r.	2384	2380	
	C	Measure							2370	2380	*2424	2378	
	C	do							*2365	2338	2332	2335	
	C	do							2384	2378	2376	2379	
	C	do							2378	2384	2381	2381	
	C	do							2365	2371	*2402	2368	

Trajectories for 500 yards.



RIFLE	ORD. 50	ORD. 100	ORD. 150	ORD. 200	ORD. 250	ORD. 300	ORD. 350	ORD. 400	ORD. 450	ANGLE OF FALL.
MANN.	8."3	18."8	25."6	30."4	31."9	32."6	32."9	23."4	14."2	0°23'
6 7/10 MEAS	7."9	18."5	25."8	30."7	32."7	33."4	33."1	24"0	14."7	0°23'
6 7/10 WT.	7."6	17."8	25."0	29."9	32."0	32."4	32."6	23."1	14."6	0°23'

Trajectories for 1,000 yards.



TEST OF SMALL-ARM RIFLE BARRELS.

[Memorandum No. 4 for the inspector of ordnance.]

NAVAL PROVING GROUND,
Indian Head, Md., July 18, 1894.

Impacts for 2,000 and 3,000 yards: A target of 1⅜ inches soft pine boards, measuring 8 by 16 feet, was rigged on a float and anchored in the river, 2,000 yards from the firing point. Firing from a rest, about 50 per cent hits could be landed on the target, using telescope sight and the range having been obtained.

With the Mannlicher, or peep sight, about 10 per cent hits were all that could be relied on. The angle of elevation used was 4° 20′, and was about the limit at which the gun could be aimed from the shoulder. After a sufficient number of hits had been made the target was shifted to the 3,000-yard mark, and over 300 rounds fired at this range. The angle of elevation being about 14° 30′, the sights could not be used. For this reason it was very difficult to make a hit, only one being recorded out of the 300 rounds. Better practice could have been made if the sight had included the target. The impacts of the 2,000 and 3,000 yard range are included in Table 7.

A sufficient number of rounds were then fired from each 6-mm. barrel to make 1,000 rounds from each, when they were dismounted and examined. Nine hundred rounds only were fired from the Mannlicher, reserving 100 rounds for the accuracy and velocity work.

Barrel M 1—thoroughly cleaned.—Examined bore and found rifling showing signs of wear. At the very origin the lands were worn down almost smooth; but rifling appeared in first rate condition from muzzle to 6 inches from origin, where the signs of wear began to appear. Scores one-half to 1 inch long of slower pitch than rifling had been made near origin, as if by bullets slipping the rifling.

Chamber gauge fitted neatly, rebounding a short distance on being thrown in.

Drop plug went through easily, fitting a little loosely in chamber end of bore.

Forced plug through from chamber to muzzle, going steadily without slipping or sticking, and recovered calipering 0.236 to 0.237 inch, with no marks of rifling.

Forced plug from muzzle to chamber, sticking a little at 18¾ inches from muzzle. Recovered calipering 0.236 inch.

Tried empty cases of cartridges last fired from this barrel in chamber-gauge template, cases going within one-twentieth inch of home.

Weight of barrel 0.5 gram less than when first weighed. Outside dimensions unchanged.

Barrel A—thoroughly cleaned.—Examined bore and found rifling showing signs of wear very similar to Barrel M 1, and to about the same extent. There were a greater number of scores near origin, and they were of a greater length.

Chamber gauge would rebound clear of barrel when thrown in.

Drop plug went through easily, fitting loosely in chamber end of bore.

Forced lead plug from chamber to muzzle, going steadily, and recovered, calipering 0.237 to 0.237 inch, rifling not showing. Forced plug from muzzle to chamber, going steadily, calipering 0.236 to 0.240 inch after recovery.

Tried in chamber gauge template the empty cases of cartridges last fired from this barrel, cases going to one-eighth inch from home. On

ıg in template an abrasion was made on case five-eighths inch from

ight of barrel, 0.7 gram less than when first weighed. Outside
ısions unchanged.
rrel M 5—thoroughly cleaned.—Examined witn bore reflector and
l rifling showing signs of wear very similar to barrel A. The scores
by bullets slipping were more numerous, and some were about 2
s long. A bruise all around bore was noticed about 6.5 inches from
uuzzle similar to the one mentioned in barrel C.
amber gauge rebounded clear of barrel on being thrown in.
op plug went through easily, fitting loosely in chamber end of

rced lead plug from chamber to muzzle, going steadily, and recov-
calipering 0.236 to 0.237 inch, rifling not well defined. Forced plug
muzzle to chamber; plug slipped one-fourth inch about 6 inches
muzzle about the location of the bruise noted. Recovered, caliper-
.236 to 0.239 inch.
ied in chamber gauge template the empty cases of cartridges last
from this barrel, cases stopping at one-fourth inch from home posi-
On turning case in template an abrasion was made five-eighths
from rim.
eight of barrel, 0.3 gram less than when first weighed. Outside
nsions unchanged.
ınnlicher—thoroughly cleaned.—Bore examined and rifling found in
rate condition. Very little signs of wear at origin and none in the

rced lead plug through; recovered it and found rifling well marked,
ering 0.255 to 0.267 inch. Dimensions unchanged.
e changes in weights given in Memorandum No. 3 were in error.
ing for accuracy and penetration at 500 yards and at 1,000 yards:
e experiments were carried out in the same manner as those first
ted. The results are included in Tables 8 and 9.
ı rounds were fired from each 6 mm. barrel with each kind of
ınition, and ten rounds from the Mannlicher for velocity. The
ns were rigged in the same way as in previous observations for
ity, but after the fifteenth round chronograph C was not used,
bservations from this instrument becoming very irregular. The
ts as taken on blotting-paper targets, 115 feet from muzzle of
showed the same amount of wobbling as in the first observations
locity.
re have been fired from barrel A 1,045 rounds, with 34 gas
, 1 hang-fire, 1 hard extraction, and 15 split cases; barrel M 1,
rounds, 28 gas leaks, 16 split cases; barrel M 5, 1,040 rounds, 28
aks, 25 split cases, and 1 misfire; Mannlicher, 927 rounds, 6 split
, and gas leaks about the mouths of all the cases. Altogether
have been fired 4,283 rounds of 6 mm. ammunition, with 72 split
, 128 gas leaks, 2 blowbacks, 4 evidence of high pressure with
extraction, 2 hang-fires, 3 misfires, and one cartridge too large to
chamber. There remain on hand 717 rounds 6 mm. ammunition
3 rounds of 6.5 mm. ammunition for any further tests required.
jump was determined by firing 50 rounds, correcting the sights
5 rounds, and found to be + 19 feet 10 inches.
Very respectfully,

N. A. McCULLY,
Ensign, U. S. Navy.

TABLE 7.—*Impacts, 2,000 and 3,000 yards.*

Date.	Barrel.	Ammunition.	Angle projection.	Barometer.	Thermometer.			Wind.		Range.	Impact.
					Attached.	Wet.	Dry.	Direction.	Force.		
June 28..	A.....	Weight.	4° 40′	30.04	88	70	88		2–3	2,000	
June 29..	A.....	Meas ...	4° 40′	30.06	86	76	88		0–1	2,000	
	A.....	Meas ...	4° 40′								
	A.....	Meas ...	4° 40′								
	A.....	Meas ...	4° 40′								
	A.....	Meas ...	4° 40′								
	A.....	Weight.	4° 40′						3–4		
	A.....	Weight.	4° 40′						3–4		
	A.....	Weight.	4° 40′								
	A.....	Weight.	4° 40′								
	A.....	Weight.	4° 40′								
	No. 5150.	Weight.									
	No. 5150.	Weight.									
	No. 5150.	Weight.									
	No. 5150.	Weight.									
	No. 5150.	Weight.									
June 28..	Mann...		1,900m						2–3		
June 29..	Mann...		1,900m								
	Mann...		1,900m								
	Mann...		1,900m								
	Mann...		1,900m								
	A.....	Weight.	14°30′							3,000	

TABLE 8.—*Accuracy at 500 yards.*

Date.	Barrel.	Ammunition.	Angle projection.	Barometer.	Thermometer.			Wind.		Error.		Impact.	Remarks.
					At tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.		
July 9	A[a]	Weight	19′ 10″	30.13	80	64	78	↖	2–3	+1⅛	+2	Nearly normal.	
	A	do								+8⅛	+4⅛		
	A	do								+7¼	+7⅛		
	A	do								+11⅛	+12⅛		
	A	do								+11	+4⅛		
	A	Meas								−32	−4¼		
	A	do								−45	−8		
	A	do								−40	+6⅛		
	A	do								−41	+7⅛		
	A	do								−38½	+3		
	M 5	Weight	19′ 10″							−9⅛	+8		
	M 5	do								+2⅜	−5		
	M 5	do								−10⅛	+13		
	M 5	do								−12	+9⅛		
	M 5	do								−20	O		
	M 5	Meas								+55	+3		
	M 5	do								+62	−3½		Gas leaks.
	M 5	do								+59	−1¼		
	M 5	do								+48½	+13¾		
	M 5	do								+56½	−1⅛		
	M 1	Weight	19′ 10″							+57	+10⅛		Do.
	M 1	do								+54¼	+20⅛		
	M 1	do								+49⅛	+20⅛		
	M 1	do								+63	+5¾		
	M 1	do								+52	+11⅛		
	M 1	Meas								+74⅛	−22		
	M 1	do								+62	−19		
	M 1	do								+60	−3		Do.
	M 1	do								+62	−4¼		
	M 1	do								+52	−21		
	Mann		O[m]							−31	+6		
	Mann									−34	+7¼		
	Mann									−25½	−10⅛		
	Mann									−42	−9⅛		
	Mann									−39	−7		

TABLE 9.—*Accuracy and penetration at 1,000 yards.*

Date.	Barrel.	Ammunition.	Angle of projectile.	Barometer.	Thermometer.			Wind.		Error.		Impact.	Penetration.	Remarks.
					At-tached.	Wet.	Dry.	Direction.	Force.	Lateral.	Vertical.			
													Inches.	
July 10	A	Meas	1° 04′	30.12	80	76	80	←	1-2	+4	−26½		11	
	A	do								+8½	−2½		10½	
	A	do								+5¾	−28		10⅝	
	A	do								+16½	−21		10⅝	
	A	do								+8½	−18		11⅝	
	A	Weight								−9½	−19½		12	
	A	do								−1½	−2½		10⅝	
	A	do								−2	−31½		11	
	A	do								−4½	−14		12⅞	
	A	do								−7	−20		12⅞	Gas leak and split.
July 11	M 5	Meas	1° 04′	30.11	88	80	92	↙	2-3	+10	+12		11¼	
	M 5	do								−2	−9		12	
	M 5	do								−7	−19½		12	
	M 5	do								−13	−6		12	
	M 5	do								−2½	+4			Gas leak
	M 5	Weight								+6½	−3¾		13⅝	
	M 5	do								+21	+16		11¼	
	M 5	do								+11	−¾		12⅝	
	M 5	do								+15	+8		13	

M 5	do					+10	+8		11	
M 1	Meas	1° 04′			1-2	−23	+2		11½	
M 1	do					−14½	−10		11¼	
M 1	do					−9	−4		12	
M 1	do					−26	−16½		11½	
M 1	do					−18	−14½		12	Do.
M 1	Weight					−40½	+3½		11½	
M 1	do					−40½	+14½		12	
M 1	do					−45½	+21½			
M 1	do					−31	+4		8¼	
M 1	do					−45	−2½		11½	
Mann		900m				−35	+12½		10¾	
Mann						−43	+6¼		11	
Mann						−29	−2¼		11¼	
Mann						−15	+13		12	
Mann						−3½	−28		11½	

TABLE 10.—*Velocity.*

	Barrel.	Ammunition.	Barometer.	Thermometer. Attached.	Thermometer. Wet.	Thermometer. Dry.	Wind. Direction.	Wind. Force.	Chronographs. A.	Chronographs. B.	Chronographs. C.	Chronographs. Mean.	Remarks.
.....	M 5...	Meas	30.10	88	78	90	↘	2-3	2250	2253	* 2324	2256	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2219	* 2289	2219	2219	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2381	2381	2374	2379	Gas leak.
	M 5...	....do	.....	.....	.....	.....	.....	.....	2318	2309	2312	2313	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2362	2362	2353	2359	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2381	2393	2377	2384	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2327	2321	2321	2323	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2437	2418	2399	2418	Do.
	M 5...	....do	.....	.....	.....	.....	.....	.....	2374	2362	n. r.	2368	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2356	2347	* 2300	2352	
.....	M 5...	Weight...	30.06	88	84	90	↘	1-2	2365	2350	* 2332	2362	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2497	2490	2504	2497	Do.
	M 5...	....do	.....	.....	.....	.....	.....	.....	2381	2381	2374	2370	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2344	2353	2338	2345	Do.
	M 5...	....do	.....	.....	.....	.....	.....	.....	2393	2390	2384	2389	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2375	2365	.....	2370	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2507	2500	.....	2504	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2381	2381	.....	2381	Do.
	M 5...	....do	.....	.....	.....	.....	.....	.....	2256	2201	.....	2250	
	M 5...	....do	.....	.....	.....	.....	.....	.....	2371	2362	.....	2367	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2371	2374	.....	2372	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2390	2393	.....	2393	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2374	2371	.....	2372	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2424	2456	.....	2440	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2377	2380	.....	2379	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2424	2408	.....	2416	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2378	2378	.....	2378	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2378	2378	.....	2378	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2384	n. r.	.....	2384	
	Mann..	....do	.....	.....	.....	.....	.....	.....	2399	2387	.....	2393	
	M 1...	Meas	.....	.....	.....	.....	.....	.....	2412	2412	.....	2412	
	M 1...	....do	.....	.....	.....	.....	.....	.....	2399	2393	.....	2396	
	M 1...	....do	.....	.....	.....	.....	.....	.....	2356	2356	.....	2356	Split case.
	M 1...	....do	.....	.....	.....	.....	.....	.....	2371	2362	.....	2367	
	M 1...	....do	.....	.....	.....	.....	.....	.....	2362	2368	.....	2365	

July 12	M 1	do	30.01	86	70	88		1-2	2405	2405		2405	
	M 1								2402	2408		2405	
	M 1								2434	2428		2431	
	M 1	do	30.01	86	70	88		1.2	2437	2437		2437	
	M 1	do							2387	2390		2389	
	M 1	Weight							2393	2399		2396	Gas leak.
	M 1	do							2418	2402		2410	
	M 1	do							2399	2390		2399	
	M 1	do							2412	2424		2418	Do.
	M 1	do							2356	2362		2359	
	M 1	do							2412	2405		2409	
	M 1	do							2431	2431		2431	
	M 1	do							2332	2341		2337	
	M 1	do							n. r.	2362		2362	
	M 1	do							2431	2450		2441	
	A	Mean							2405	2387		2396	
	A	do							2415	2424		2420	
	A	do							2431	2424		2428	
	A	do							2434	2424		2420	
	A	do							2412	2399		2406	
	A	do							2434	2428		2431	
	A	do							2387	2390		2389	
	A	do							2378	2387		2383	
	A	do							2365	2374		2370	
	A	do							2440	2456		2448	
	A	Weight							2437	2412		2424	
	A	do							2444	2434		2439	
	A	do							2490	2470		2480	
	A	do							n. r.	2399		2399	
	A	do							n. r.	2440		2440	
	A	do							2418	2424		2421	
	A	do							2417	2405		2411	
	A	do							2473	2453		2463	
	A	do							n. r.	2415		2415	
	A	do							2497	2476		2487	

TABLE 11.—*Velocity 6 mm. and 6.5 mm.*

	A.	M 1.	M 5.	Mann.	Mean 6 mm.
Mean of 10 rounds ammunition by measure, new barrel	2,384.7	2,404.7	2,366.5	2,394.1	2,385.3
Mean of 10 rounds ammunition by weight, new barrel	2,455.3	2,462.6	2,453.8	.....	2,457.2
Mean of 10 rounds ammunition by measure, after 1,000 rounds	2,410.0	2,396.3	2,337.1	2,390.6	2,381.1
Mean of 10 rounds ammunition by weight, after 1,000 rounds	2,437.9	2,396.2	2,385.3	.....	2,406.5
	2,420.0	2,414.9	2,385.7	2,392.3	2,403.9
Mean difference of 10 rounds ammunition by measure, new barrel	36.3	38.2	39.8	20.1	38.1
Mean difference of 10 rounds ammunition by weight, new barrel	24.1	28.0	30.2	.....	27.4
Mean difference of 10 rounds ammunition by measure, after 1,000 rounds	21.2	21.7	47.5	15.9	30.1
Mean difference of 10 rounds ammunition by weight, after 1,000 rounds	24.9	26.2	46.7	.....	32.6
	26.6	28.5	41.1	18.0	32.1

TEST OF 6-MM. SMALL-ARM RIFLE BARRELS.

[Memorandum No. 5 for the inspector of ordnance in charge.]

NAVAL PROVING GROUND,
Indian Head, Md., August 17, 1894.

One hundred rounds each were fired from barrels M 1 and A, and the barrels laid aside without cleaning and allowed to remain so for ten days. They were then cleaned and examined, a few small rust spots remaining in bore, but after firing a few rounds these spots disappeared, and on cleaning the bore looked as bright and clean as ever.

On August 4, 1894, received 2,000 rounds 0.236 ammunition from the Winchester Repeating Arms Company; method of loading not noted.

A number of rounds sufficient to complete 2,000 rounds from each barrel were then fired from M 1 and A, and the barrels dismounted and examined, with the following results:

Barrel M 1.—Rifling at origin entirely worn away and only faint traces of it for the first 2 or 3 inches from origin. Bore showed traces of wear throughout its length.

Chamber gauge fitted neatly, but would rebound on being thrown in.

Drop plug went through easily, fitting very loosely in chamber end of bore and allowing of a slight motion when halfway in muzzle.

Forced lead plug through from chamber to muzzle, going steadily without sticking or slipping, and recovered with no marks of rifling apparent, calipering 0.237 inch.

Forced plug through from muzzle to chamber with similar results.

Tried empty cases of cartridges last fired from this barrel in chamber-gauge template and found them to go to one-twentieth inch of home. Outside dimensions of barrel unchanged. Weight of barrel 1.2 gram less than when first weighed.

Barrel A.—Rifling at origin entirely worn away, and only faint traces left of it for the first 2 or 3 inches from origin. Bore showed traces of wear throughout its length.

Chamber gauge fitted easily; rebounded when thrown it.

Drop plug went through easily, fitting very loosely in chamber end of bore, and allowing of a slight motion when about halfway in muzzle.

Forced lead plug through from chamber to muzzle, going steadily

without sticking or slipping, and recovered with no marks of rifling apparent, and calipering 0.237 inch.

Forced lead plug through from muzzle to chamber, sticking slightly at a point 21¼ inches from muzzle.

Tried empty cases of cartridges last fired from this barrel in chamber-gauge template and found them to go to one-eighth inch from home. On turning the case in the template an abrasion was made one-half inch from rim. Outside dimensions of barrel unchanged. Weight of barrel 1.3 grams less than when first weighed.

Fired ten rounds for velocity under same conditions as in previous experiments for velocity, using ammunition by weight from the same box as all the other observations for velocity with ammunition by weight. Results in Table 12.

There have been fired altogether from barrel M 1, 2,018 rounds, with 79 gas leaks, 20 split cases, and 1 missfire; from barrel A, 2,021 rounds, with 116 gas leaks, 17 split cases, 1 hang fire, 1 hard extraction, and 3 missfires. In addition to the faulty ammunition noted in memorandum No. 4, there are 133 gas leaks, 6 split cases, and 4 missfires.

Barrel B has been cut down 1 inch in length, and observations are being made as to the effect on velocity and angle of vibration, with the intention of continuing the shortening of the barrel 1 inch between each series of observations.

Very respectfully,

N. A. McCULLY,
Ensign, U. S. Navy.

Approved and forwarded.

N. E. MASON,
Lieutenant, U. S. Navy, Inspector of Ordnance, in Charge.

TABLE 12.—*Velocity.*

Date.	Barrel.	Ammunition.	Barometer.	Thermometer.			Wind.		Velocity.	Impact.*
				Attached.	Wet.	Dry.	Direction.	Force.		
Aug. 14	M 1		30.11	80	76	82	↙	1-2	2424	
	M 1								2421	
	M 1								2434	
	M 1								2483	
	M 1								2483	
	M 1								2470	
	M 1								2405	
	M 1								2483	
	M 1								2393	
	M 1								2371	
	A								2408	
Aug. 15	A		29.90	90	76	90	↙	4-5	2444	
	A								2437	
	A								2500	
	A								2402	
	A								2449	
	A								2440	
Aug. 16	A		29.96	80	76	80			2442	
	A								2424	
	A								2402	

* Impacts nearly normal, there being about the same amount of wabbling at 100 as at first.

REPORT

OF THE

CHIEF OF THE BUREAU OF CONSTRUCTION AND REPAIR.

WASHINGTON, D. C., *October 1, 1894.*

SIR: In obedience to the Department's instructions I have the honor to submit herewith a report of the work done under the cognizance of this Bureau during the year ending June 30, 1894, and also submit estimates for appropriations required for the year ending June 30, 1896.

The estimates for the expenditures of the Bureau, as given in the statement marked A, are in accordance with existing laws.

The estimate marked B is for the general repair of vessels at navy-yards and on foreign stations, purchase of stores, materials, machinery, tools of all kinds, preservation of material and stores, and for the proper performance of all work of repair and maintenance under the cognizance of this Bureau.

The estimates in the statement marked C are for the pay of such clerks and writers at the several navy-yards as are indispensable for the proper and systematic prosecution of the work.

The estimates marked D are for continuing the work on hulls and outfits of vessels in course of construction.

Appendix E contains a list of vessels of the Navy, with dimensions, armament, etc.

Appendix F shows condition of work on July 1, 1894, on vessels building or completing at navy-yards or under contract at private yards; also tabular statement of repairs completed during the year.

Appendix G contains reports from naval constructors in charge of work at navy-yards regarding improvements needed in the plants for shipbuilding and repair work.

PROGRESS OF WORK ON VESSELS IN COURSE OF CONSTRUCTION.

Reference to Appendix F shows that work on the vessels in course of construction has made fairly good progress during the year. Aside from delays due to slow delivery of armor or other material, the ultimate completion of these vessels may be approximately given as fol-

lows, these tables being in all cases dependent upon the regular delivery of armor in the order needed for prompt and efficient work:

Condition of vessels in course of construction on July 1, 1894.

Name of vessel.	Where building.	Percentage of completion, July 1, 1894.	Time necessary to complete after receipt of armor and ordnance material.	Probable date of completion.
Maine	Navy-yard, N. Y.	98	4 months	
Puritan	do	85	6 months	
Terror	do	92	4 months	
Texas	Navy-yard, Norfolk	93	6 months	
Amphitrite	do	98	2 months	
Monadnock	Navy-yard, Mare Island, Cal.	78		Feb., 1895.
Katahdin	Bath, Me	80	3 months	
Indiana	Wm. Cramp & Sons, Philadelphia, Pa.	87	7 months	
Massachusetts	do	84	do	
Iowa	do	19		
Brooklyn	do	20		July, 1895.
Minneapolis	do	93		Nov., 1894.
Oregon	Union Iron Works, San Francisco, Cal.	80	4 months	June, 1895.
Olympia	do	99	2 months	Nov., 1894.
Gunboat No. 7	Newport News S. B. & D. D. Co	2		*Jan. 22, 1896.
Gunboat No. 8	do	(†)		*Jan. 29, 1896.
Gunboat No. 9	do	(†)		*Jan. 29, 1896.
Ericsson	Iowa Iron Works, Dubuque, Iowa	98		Nov. 1, 1894.

*Contract time of completion. † Keel not laid.

Vessels which have had official preliminary trial trips during the fiscal year.

Name of vessel.	Where and by whom built.	Date of trial.	Average speed for 4 hours.	Present condition.
			Knots.	
Castine	Bath Iron Works, Bath, Me.	Sept. 15, 1893	16.03	Fitting out at navy-yard, N. Y.
Marblehead	Harrison Loring, Boston, Mass.	Dec. 7, 1893	18.44	In commission. North Atlantic Station.
Columbia	Wm. Cramp & Sons, Philadelphia, Pa.	Nov. 18, 1893	22.80	Do.
Olympia	Union Iron Works, San Francisco, Cal.	Dec. 15, 1893	21.69	Completing at works of contractors.
Montgomery	Columbian Iron Works, Baltimore, Md.	Jan. 19, 1894	19.056	In commission. North Atlantic Station.

Vessels which have undergone preliminary trial trips since July 1, 1894.

Minneapolis	Wm. Cramp & Sons, Philadelphia, Pa.	July 14, 1894	23.073	Completing at works of contractors.

The *New York*, which had her official trial in May, 1893, was finally completed and passed out of the hands of the contractors September 19, 1893.

The *Machias*, whose official trial was on June 10, 1893, was delivered by the contractors to commandant navy-yard, Portsmouth, N. H., on July 1, 1893.

Of the above vessels, the *Indiana*, *Texas*, and *Oregon* have had unofficial preliminary trials, and the *Maine* will undergo her official machinery trial in a few days.

Work on all the armored vessels has been impeded by delays in the receipt of armor, it being impossible to complete certain portions of the hull until the armor is in place and securely bolted. This causes not only delay in the final completion of the ship, but adds greatly to the cost of the work.

LAUNCHES, SURVEYS, ETC.

Vessels launched during the year ending June 30, 1894.

Name of vessel.	Type.	Displacement complete, ready for sea.	Date of launch.
		Tons.	
Oregon	Armored battleship, twin screw	10,288	October 26, 1893.
Minneapolis	Triple screw, protected cruiser	7,375	August 12, 1893.
Ericsson	Torpedo boat	120	May 12, 1894.

Vessels stricken from Navy Register during the year ending June 30, 1894.

Name of vessel.	Type.	Date.
Catalpa	Wooden tug	Condemned and placed in ordinary January 6, 1894.
Kearsarge	Wooden sloop	Wrecked on Roncador Reef February 10, 1894.

Vessels surveyed and repairs ordered during the fiscal year 1893-'94.

Vessel.	Place.	Date.
Atlanta	Norfolk	May 28, 1893
Leyden	Portsmouth, N. H	Aug. 9, 1893
Hartford	Mare Island	Aug. 11, 1893
Ranger	do	Oct. 5, 1893
Miantonomoh	New York	Oct. 16, 1893
Constellation	Norfolk	Oct. 7-14, 1893
Mohican	Mare Island	Oct. 23, 1893
Portsmouth	New York	Oct. 27, 1893
Alert	Mare Island	Oct. 25, 1893
Atlanta	Norfolk	Nov. 21, 1893
Boston	Mare Island	Nov. 20, 1893
Monongahela	Norfolk	Dec. 26, 1893 to Jan. 20, 1894
Fern	New York	Apr. 30, 1894
Portsmouth	do	May 3, 1894
Thetis	Mare Island	May 26, 1894
Fern	New York	June 9, 1894

Vessels repaired at the different navy-yards during the year ending June 30, 1894.

Amphitrite.	Cincinnati.	Marblehead.	Puritan.
Alert.	Dolphin.	Machias.	Ranger.
Atlanta.	Detroit.	Miantonomoh.	San Francisco.
Bennington.	Dale.	Monterey.	Standish (tug).
Bancroft.	Essex.	Montgomery.	Triton (tug).
Baltimore.	Fortune (tug).	Maine.	Thetis.
Boston.	Fern.	Newark.	Terror.
Constellation.	Kearsarge.	Nina (tug).	Vesuvius.
Charleston.	Monongahela.	New York.	Vermont.
Cushing.	Mohican.	Nantucket.	Wahneta.
Castine.	Monadnock.	Portsmouth.	Yorktown.

New construction.

In the appropriation for the naval service for the fiscal year ending June 30, 1895, approved July 26, 1894, provision was made, under "Increase of the Navy," for 3 torpedo boats, to cost altogether, including armament and equipment, not more than $450,000. The boats are to be built under the provisions of the act of August 30, 1886, entitled "An act to increase the naval establishment," as to material for said boats, their engines, boilers, etc., save that in all their parts said boats shall be of domestic manufacture.

The Bureau has prepared, for the information of prospective bidders, a circular defining the chief characteristics of these torpedo boats, and noting the two classes under which bids may be made, the detailed information contained in the circular being as follows:

Class 1. For the construction of the hull and machinery, including engines, boilers and appurtenances, and equipment, complete in all respects, in accordance with the plans and specifications provided by the Secretary of the Navy.

Class 2. For the construction of the hull and machinery, including engines, boilers and appurtenances, and equipment, complete in all respects, in accordance with the plans and specifications provided by the bidder.

Bidders may, if they so desire, adopt the plans and specifications of the Department for the hull or machinery, or any part of either, and embody them in their plans and specifications to be submitted with their proposals.

In order that ample time may be given for the preparation of plans, this circular is issued to ship and engine builders who may desire to submit designs of their own.

The following elements or qualities must be obtained in all the designs:

The average speed to be maintained for two consecutive hours, under conditions to be prescribed by the Secretary of the Navy, must not be less than 24½ knots per hour.

The boats are to be built and fitted complete for sea by the contractors, with the exception of the ordnance and ordnance outfit of all kinds and sea stores; that is, the contractors furnish small boats, furniture of all kinds, anchors, cables, rigging, awnings, ridge ropes, hatch hoods, galleys, and furniture for galleys of all kinds.

Two conning towers will be placed on each boat, one about 30 feet from each end.

The spaces allowed for torpedo tubes, the torpedoes and appurtenances, and rapid-firing guns are to be shown on the plans of designs submitted.

Accommodations must be provided for 4 commissioned officers, 12 men, and 4 machinists.

The boat on her trial trip for speed must carry the following weights, additional to that of the complete hull, machinery, and spare parts:

	Tons.
Topedo gear and torpedoes, revolving guns and ammunition	5.5
Coal	9.0
Crew, boats, anchors, equipment, etc	7.0
Total	21.5

The coal capacity must be at least 45 tons of 43 cubic feet per ton.

Any and all designs for these boats submitted must be accompanied with complete plans and specifications for building, and calculations of weights, displacement, and range of stability under the conditions of trial and deep load displacement; also, calculations showing trim and range of stability when the several water-tight compartments are

flooded; also, such calculations as will demonstrate the satisfactory strength of the whole structure.

The design of machinery submitted must fulfill the general requirements to be issued by the Bureau of Steam Engineering. Such design must be accompanied by drawings and specifications in sufficient detail to enable the strength of the principal parts, and the probable efficiency of the whole design, to be readily determined. Further, all designs must be accompanied by detailed calculations for the weight and position of the center of gravity of all machinery, the former not to exceed the weight assigned in this circular if it is proposed to adopt the Department's design of hull.

The general dimensions and weights of the Department's design are as follows:

Length on load line	feet..	160
Beam on load line	do...	16
Mean draft	do...	5
Displacement (about)	tons..	135
I. H. P. (about)		2,000
Speed, per hour	knots..	24½

Armament:

Three single deck-torpedo guns.
Three 1-pounder rapid-firing guns.
Four auto-mobile torpedoes.
1,800 rounds 1-pounder ammunition.

Weights:

	Tons.
Machinery complete	60
Ordnance	5½
Coal (trial displacement)	9
Crew, boats, anchor, water, equipment, etc	7

If, on trial, the average speed of the boat shall equal or exceed 24½ knots per hour for two consecutive hours, the boat will be accepted in so far as the speed is concerned. If the speed falls below 24¼ knots per hour, and exceeds 23 knots, the boat will be accepted at a reduced price, the reduction being at the rate of $10,000 per knot speed below 24½ knots. If the speed falls below 23 knots per hour the boat will, in the discretion of the Secretary of the Navy, be rejected or accepted at a reduced price mutually agreed upon between the Secretary and the contractors. In case of a rejection, any money that may have been paid to the contractors on account shall be refunded.

New steam tug.

The last appropriation bill also contained a provision appropriating $50,000 for the construction of a steam tug at the navy-yard, Mare Island, Cal.

The plans and specifications have been completed by the Bureau, the dimensions and particulars of the design being as follows:

Length over all	121′	0″
Length on load water-line	110′	3¼″
Breadth, extreme, exclusive of guard	25′	0″
Breadth, extreme, to outside of guard	25′	7″
Depth, top of beam at side to top of floor	12′	4″
Draft, fore edge of stem at L. W. L.	9′	0¼″
Draft, extreme, at sternpost	10′	0″
Freeboard, least	4′	6¼″
Displacement at load water line	344.97 tons.	
Schooner rig, sail area	1,542.98 sq. ft.	
Type of engine: Triple expansion, inverted—		
Diameter of cylinders	13″, 20″, 31″.	
Stroke of piston	30″	
Revolutions per minute		150
Indicated horse power		500

Improvement of navy-yard plants.

The improvement in navy-yard plants, suggested in the reports from naval constructors contained in Appendix G, are substantially the same as those which have been recommended for several years past.

On account of the difficulty in obtaining appropriations for work of this kind, however, the Bureau has refrained from recommending to the favorable consideration of the Department any but the most necessary repairs or improvements.

Every year, however, adds to the general deterioration of buildings and plants, and the Bureau now considers it necessary, not only in the interests of efficiency, but also of economy, that definite and comprehensive measures be taken to put the navy-yard plants in a condition to satisfactorily meet all probable demands which may be made upon them both in the matter of repairs and new construction.

Modern steel fleets require far more attention than the old wooden ships to keep them in an efficient state, and it is absolutely necessary that our principal navy-yards should be fully equipped with the latest appliances for quickly making good any damage due to casualities of war or ordinary cruising.

The reports of the naval constructors at the navy-yards at New York, League Island, Norfolk, and Mare Island show the absolute necessity of buildings to replace the tumble-down wooden structures, which are inefficient as shelters and dangerous to life, besides being a constant menace from their liability to taking fire.

At all of these yards costly tools are deteriorating through lack of proper buildings, and delayed action will entail serious loss on the Government.

The Bureau can not impress too strongly upon the Department the necessity for speedy action in this matter and requests that the Bureau of Yards and Docks be directed to submit estimates to cover the cost of the buildings mentioned in the reports of naval constructors at navy-yards as necessary for the proper care and preservation of tools already on hand and the installation of such capstans, etc., at dry docks as experience has proved absolutely necessary for efficiency.

While the Bureau approves, in general, the recommendations of naval constructors as to the improvement of navy-yard plants, it deems it useless to ask for the total amount called for in their estimates, and therefore submits estimates for only so much as seems absolutely necessary to continue, in a systematic way, the improvements already begun:

For navy-yard, Portsmouth, N. H., for necessary alteration of shops and purchase of new tools	$10,000
For navy-yard, Boston, Mass., for necessary alteration of shops and purchase of new tools	20,000
For navy-yard, New York, N. Y., new tools, portable hoisting engine, push cars, boilers in plumbing shop, and minor alterations in arrangement of plant	50,000
For navy-yard, League Island, Philadelphia, Pa., tools for ship-fitting shop, furnaces, bending slabs, steam hammers, etc	30,000
For navy-yard, Norfolk, Va., locomotive traveling crane, floating derrick, ship-fitting shop at dry dock, etc	125,000
For navy-yard, Mare Island, Cal., for completing bending slabs, installing galvanizing and electric power plants, building reverberatory furnace, supplying and installing new tools, etc	70,000

Repair shops at Port Royal and Puget Sound.

approaching completion of the dry docks at the naval stations rt Royal, S. C., and Sidney, Puget Sound, Wash., necessitates provision for effecting minor repairs on vessels which may be uled at those yards. It is not the intention of the Bureau, at ime, to recommend the installation of any extensive plant, but) much as would be absolutely necessary in effecting the ordinary s which are usually found necessary when a vessel goes into or cleaning and overhauling.

the above purpose the Bureau recommends an appropriation of 0 each for the Naval Stations at Port Royal and Puget Sound for ting out of repair shops and the purchase and erection of tools same.

Dry Docks.

onsidering the improvements in navy-yard plants necessary for icy of work under the cognizance of this Bureau, it is necessary g to the attention of the Department the absolute necessity for r docking facilities. In the event of sudden war this country be in a deplorable condition on account of the limited number k of capacity of its Government docks, and, unlike Great Britain, comparatively few private docks which could be pressed into in an emergency.

ships require frequent docking under the ordinary conditions e, and the casualties of war would undoubtedly largely augment mand for these indispensable adjuncts of a dockyard. Even is only under the most favorable conditions of tide that some of gest vessels can be docked at all, and in war this might involve ctical fighting and cruising efficiency of some of our most valu- ips.

Bureau is so impressed with our present weakness in this respect, desires to call the especial attention of the Department to so matter, and, in this connection, begs to quote the following para- from the reports of the naval constructors at Norfolk, Va., and sland, Cal., in reference to needed alterations in present docks necessity for additional docking facilities.

naval constructor at the Norfolk yard says:

ck No. 1 (stone dock) is limited in capacity to vessels of the size of the and if lengthened 100 feet could be used for all the cruiser class of vessels, ould increase its usefulness to a very large extent.

ck No. 2 is so constructed at the gate that it cannot be used for docking the ps now building, and it will be exceedingly dangerous to attempt the of the *Texas* or armored cruisers in this dock when at the load draft. An l dry dock of sufficient size for these vessels is recommended, and the impor- d necessity of beginning at the earliest possible moment the construction of ck at this navy-yard can not be overestimated. An available and desira- djoins dry dock No. 2.

ifficulty of berthing ships at this navy-yard, owing to insufficient , has been frequently experienced during the past year, and the necessity ng ships at a considerable distance from the shops has delayed and increased of the work of repairs. It has occurred several times during the past year dry docks were in use and every berth at the wharves occupied. On two it was necessary to berth a ship at St. Helena, opposite the navy-yard.

It is recommended that the timber basin, no longer required for the original purpose, should be cleared out and converted into a fitting basin by building a wall and gate across the continuation of Rowan avenue, utilizing that portion of the dock to the west for spar timber, the eastern portion to be deepened and provided with retaining walls and a pontoon bridge at the eastern end.

The report of the naval constructor at Mare Island contains this reference to the docking facilities at that yard:

To meet these requirements this yard is supplied with only one dock, which is in nearly constant use the year round, and in case of any accident to its caisson or pumps a serious delay would occur in the repair of vessels.

Another dock should be built at this yard, and in the mean time the present dock should be fitted with power capstans at the head and mouth to properly and safely handle vessels in docking and undocking. Attention is called to the fact that these power capstans have been found necessary, and have been fitted at the Norfolk and New York yards, while at this yard, where there is much greater need for them, owing to the absence of a tug, only hand capstans have been supplied, and one of these is not even secured in place.

Owing to the mud at the entrance of this dock the caisson can be removed only at high water, thus limiting seriously the opportunities for docking, and from this cause delays have occurred for as long a period as three days, otherwise overtime work at very unreasonable hours would have been necessary. This could be remedied by the addition of another strake to the body of the caisson, at an estimated cost of $3,000.

These statements show clearly the necessity for increased docking facilities and the desirability of making certain improvements in those docks already built, and the Bureau earnestly recommends the above suggestions to the Department for early and favorable consideration.

Efficiency of Navy-yard Plants.

Continued experience with our new steel ships demonstrates fully the necessity of keeping up an efficient navy-yard organization for the maintenance of the plant in a state of efficiency and the rapid execution of repairs consequent upon the ordinary casualties of the service. These repairs can be effected at a navy-yard more expeditiously, economically, and satisfactorily than anywhere else, and it is to the Government's best interest to maintain an efficient organization for that purpose, if for no other. But the maintenance of a skilled force of mechanics is somewhat dependent upon their steady employment, which can only be accomplished by providing them with regular work during those seasons of the year when the fleet is away from home waters on its annual cruise.

The most economical and effectual way of accomplishing this is to have building at each of the main repair yards at least one vessel of sufficient size to constantly employ a force of workmen sufficient to satisfy the emergency demands usually made by the fleet when undergoing its annual overhauling.

This question has not hitherto been forced upon the notice of the Department on account of the three principal navy-yards having been supplied with such an amount of new construction as to enable them to keep the larger part of their force constantly employed. This state of affairs is gradually changing, however, and the approaching completion of vessels in course of construction at the New York, Norfolk, and Mare Island navy-yards will soon leave those establishments in an embarrassing condition by reducing the force of skilled workmen to a number just sufficient to maintain the efficiency of the plant, thus

ssitating the taking on of new and possibly unskilled men when- a ship comes to the yard for overhauling and repairs.

is well known that the best ship mechanics cannot be obtained in such haphazard way, constant employment being with them, as in other trades, a prime consideration, the best men always going to se places where they have a reasonable chance of steady work.

his condition of comparative inefficiency will confront the Depart- it in a short time, unless Congress authorizes in the immediate ure the laying down of at least one vessel at each of the navy-yards New York, Norfolk, and Mare Island.

'oreign governments, whose experience with iron and steel vessels nore extended than ours, have realized the necessity for keeping up ir navy yard organization and have consistently followed out the ctice of maintaining an efficient force by laying down new ships to lace those completed.

Carpenters.

n his annual report for 1892 the chief constructor called special ention to the need for additional carpenters. The Bureau desires to terate all that was said in the former report, and to renew the recom- ndation for an increase in the number of those officers. The num- of carpenters now on the list is 3 less than it was in July, 1892, and less than in July, 1886, and yet the demand for their services is eater now than it was in 1886.

The duties of the carpenter in modern steel vessels are even more portant than they were in the old wooden ships, as may be readily n by reference to the Navy Regulations recently issued, which pre- ibe the duties of the carpenter as follows:

> * * * He shall be held accountable for the good condition of all hand pumps, h their attachments, pipes, drains, valves, and other appurtenances * * * e shall, except when otherwise directed, be held responsible for the cleanliness good condition of all capstans, windlasses, steering engines, winches, pumps, es, air ducts, and pipes.

The efficiency of the above machinery and fittings is an important n in the general efficiency of the ship, and necessitates constant and elligent care and supervision on the part of the officer intrusted h that responsibility.

Since the reconstruction of the Navy was begun carpenters have n constantly employed at navy-yards and private shipbuilding yards assisting the naval constructor in the general duties of supervision construction work, and have proved valuable assistants.

The work at navy-yards and private shipbuilding yards is especially ful in giving them extended experience in auxiliary machinery, ship- rk and fittings, which will prove of great benefit to them in the per- mance of their duties on cruising ships.

The number of carpenters now on the active list is quite insufficient provide for the exigencies of the fleet, navy-yards, and other shore tions, and this number will be reduced by 8 within the next four ars, taking into consideration retirements for age alone. The Bureau, erefore, invites the attention of the Department to this matter, and ongly recommends that the number of carpenters be increased to at least.

Experimental tank.

The Bureau desires to renew most earnestly previous recommendations in relation to the establishment of an experimental tank.

One of the greatest obstacles encountered by this Bureau in designing vessels is the determination of a reasonably exact speed which can be obtained with a ship of known displacement, horse power, and underwater form. At present, our only data for such purposes is derived from more or less inaccurate reports of the performance of foreign vessels, and is necessarily very unsatisfactory. The Bureau in the past has not even had the benefit of experience gained from thorough and exhaustive speed trials of our own ships, exigencies of the service usually preventing a complete series of progressive speed trials, such as have been found of so much value in other services.

The lack of reliable data, which can only be accurately obtained from these two sources, has hampered the Bureau in its previous design work, and placed it at a decided disadvantage in fixing upon the approximate speed to be expected from any given design.

The Bureau in no sense desires to depart from the custom of giving premiums for speed in excess of that stipulated in the contract. Past experience proves most conclusively that the inducement of a substantial speed bonus compels a contractor to use his utmost endeavor to allow none but the best material and workmanship to enter into the construction of the propelling machinery, thereby insuring to the Navy a high quality of work, such as could not be obtained by any mere system of Government inspection, no matter how rigid.

But, granting fully the desirability of speed pemiums, it follows as a matter of justice to both the Government and the contractor that the speed fixed upon should be predicated upon the best possible data, in order that it might not, on the one hand, be so high as to make its accomplishment a matter of doubt, thereby entailing possible loss on the contractor; while, on the other hand, the Government should be protected by not having the speed fixed too low, thus enabling the contractor to win, without effort, what was intended to be a reward for only good and efficient workmanship.

The commercial value of an experimental tank has been well demonstrated by the experience of a private establishment on the Clyde, which has had one in full operation for ten years. Aside from the scientific value of the information derived, they claim that it has been the means of saving them thousands of dollars by enabling them to determine accurately the best form of a ship to attain a certain speed, the dimensions of the ship being restricted by certain definite considerations.

Some of the most valuable contributions to the literature of the "resistance of ships" were made by the late Mr. William Froude, and were based directly upon the results of his experiments at the admiralty experimental tank, of which he was the originator and director up to the time of his death.

The British admiralty have at the present time, and have had for several years past, 3 or 4 skilled officials constantly on duty at their experimental tank at Haslar, and no new design is laid down until full

trials have been made of the model and accurate information obtained upon which the future performance of the vessel may be reliably predicted.

An appropriation of $100,000 will suffice for the complete installation of a plant of this kind, including all necessary structures, and the Bureau most earnestly recommends it to the favorable consideration of the Department, in the full belief that it will result not only in satisfactory knowledge as to the qualities of proposed designs of vessels, but will also lead to direct economy by enabling closer approximations to be made in the estimated speed, performance, etc.

Very respectfully,

PHILIP HICHBORN,
Chief Constructor, U. S. Navy, Chief of Bureau.

The SECRETARY OF THE NAVY.

ESTIMATES, APPROPRIATION CONSTRUCTION AND REPAIR, 1895–'96.

Estimates of appropriations required for the fiscal year ending June 30, 1896, by the Bureau of Construction and Repair, Navy Department.

Detailed objects of expenditures and explanations.	Estimated amount required for each detailed object.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for current fiscal year ended June 30, 1895.
A. *Salaries.*			
Chief clerk (appropriated July 30, 1894)	$1,800.00		
One draftsman (appropriated July 30, 1894)	1,800.00		
One assistant draftsman (appropriated July 30, 1894)	1,400.00		
One assistant draftsman (appropriated July 30, 1894)	1,200.00		
Two clerks of class 3 at $1,600 each (appropriated July 30, 1894)	3,200.00		
One clerk of class 2 (appropriated July 30, 1894)	1,400.00		
One clerk of class 1 (appropriated July 30, 1894)	1,200.00		
One assistant messenger (appropriated July 30, 1894)	720.00		
One laborer (appropriated July 30, 1894)	660.00		
		$13,380.00	$13,380.0
B. *Construction and repair of vessels.*			
For preservation and completion of vessels on the stocks and in ordinary; purchase of materials and stores of all kinds; steam steerers, pneumatic steerers; steam capstans; steam windlasses and other steam auxiliaries; labor in navy-yards and on foreign stations; purchase of machinery and tools for use in shops; wear, tear, and repair of vessels afloat; general care, increase, and protection of the Navy in the line of construction and repair; incidental expenses, such as advertising, freight, foreign postage, telegrams, telephone service, photographing, books, professional magazines, plans, stationery, and instruments for drafting room. (Appropriated July 26, 1894.)	1,000,000.00	1,000,000.00	1,058,000.0
C. *Civil establishment.*			
At navy-yard, Portsmouth, N. H.:			
One clerk to naval constructor (appropriated)	1,400.00		
Two writers, at $1,017.25 each (appropriated)	2,034.50		
At navy-yard, Boston, Mass.:			
One clerk to naval constructor (appropriated)	1,400.00		
At navy-yard, Brooklyn, N. Y.:			
One clerk to naval constructor (appropriated)	1,400.00		
Three writers, at $1,017.25 each (appropriated)	3,051.75		
At navy-yard, League Island, Pa.:			
One clerk to naval constructor (appropriated)	1,400.00		
At navy-yard, Washington, D. C.:			
One clerk to naval constructor (appropriated)	1,400.00		
At navy-yard, Norfolk, Va.:			
One clerk to naval constructor (appropriated)	1,400.00		
Two writers, at $1,017.25 each (appropriated)	2,034.50		
At navy-yard, Pensacola, Fla.:			
One writer (appropriated)	1,017.25		
At navy-yard, Mare Island, Cal.:			
One clerk to naval constructor (appropriated)	1,400.00		
Two writers, at $1,017.25 each (appropriated)	2,034.50		
		19,972.50	19,972.5
D. *Increase of the Navy—Construction and machinery.*			
On account of hulls and outfits of vessels and steam machinery of vessels heretofore authorized	.....	7,879,222.00	

BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, August 31, 1894.

SIR: We have the honor to submit herewith, in duplicate, joint estimates (inclosures Nos. 1 and 2) of the amounts required by the Bureaus of Construction and Repair and Steam Engineering, under appropriation "Increase of the Navy, Construction and Machinery," for work on new vessels authorized by Congress, to June 30, 1896, as per statements in detail herewith (marked inclosures Nos. 3 and 4), viz:

Sheet D.

Under Bureau of Construction and Repair:		
For fiscal year 1894–'95	$6,169,175	
For fiscal year 1895–'96	2,782.317	
Total		$8,951,492
Bureau of Steam Engineering:		
For fiscal year 1894–'95	3,288,617	
For fiscal year 1895–'96	1,620,280	
Total		4,908,897
Aggregate		13,860,389
Balance in Treasury July 1, 1894	26,142	
Appropriation for fiscal year 1894–'95	5,955,025	
		5,981,167
Appropriation required for fiscal year 1895–'96		7,879,222

This amount, $7,879,222, is the estimated amount required to be appropriated for work on new vessels authorized by Congress, for "Increase of the Navy, Construction and Machinery," for the fiscal year ending June 30, 1896.

We are, sir, very respectfully,

PHILIP HICHBORN,
Chief Constructor, U. S. N.,
Chief of Bureau of Construction and Repair.
GEO. W. MELVILLE,
Engineer-in-Chief, U. S. N.,
Chief of Bureau of Steam Engineering.

The SECRETARY OF THE NAVY.

APPENDIX E.—*Table of*

ARMORED

Name.	Type.	Keel laid.	By whom and where built or building.	Condition or service.	Ship fully equipped ready for sea, all stores on board. Normal coal supply.			
					Length on load water line.	Extreme breadth.	Mean draft.	Displacement.
					Ft. In.	*Ft. In.*	*Ft. In.*	*Tons.*
Puritan	Iron low free-board coast-defense monitor. Two steel barbette turrets.	1875	John Roach Chester, Pa.	Completing at navy-yard, New York.	229 6	60 1½	18 0	6,060
Amphitrite	do	1874	Harlan & Hollingsworth, Wilmington, Del.	Completing at navy-yard, Norfolk, Va.	259 6	55 10	14 6	3,990
Monadnock	do	1874	U. S. navy-yard, Mare Island, Cal.	In course of completion.	259 6	55 10	14 6	3,990
Miantonomoh	Iron low free-board coast-defense monitor. Two compound armor turrets.	1874	John Roach, Chester, Pa.	North Atlantic station.	259 6	55 10	14 6	3,990
Terror	Iron low free-board coast-defense monitor. Two steel turrets.	1874	Wm. Cramp & Sons, Philadelphia, Pa.	Completing at navy-yard, New York.	259 6	55 10	14 6	3,990
Monterey	Steel low free-board monitor. Two steel barbette turrets.	1889	Union Iron Works, San Francisco, Cal.	Pacific station.	256 0	59 0	14 10	4,084
Maine	Steel armored cruiser. Two steel barbette turrets.	1888	U. S. navy-yard, Brooklyn, N. Y.	Building	318 0	57 0	21 6	6,682
New York	do	1890	Wm. Cramp & Sons, Philadelphia, Pa.	North Atlantic station.	380 6½	64 10	23 3½	8,200
Brooklyn	Steel armored cruiser. 4 8″ barbette turrets.	1893	do	Building	400 6	64 8¼	24 0	9,271
Katahdin	Steel harbor-defense ram.	1891	Bath Iron Works, Bath, Me.	do	250 9	43 5	15 0	2,155
Texas	Steel armored battle ship. Two steel turrets.	1889	U. S. navy-yard, Norfolk, Va.	do	301 4	64 1	22 6	6,315
Massachusetts	Steel coast-line battle ship. 2 13″ barbette turrets. 4 8″ barbette turrets.	1891	Wm. Cramp & Sons, Philadelphia, Pa.	do	348 0	69 3	24 0	10,288
Indiana	do	1891	do	do	348 0	69 3	24 0	10,288
Oregon	do	1891	Union Iron Works, San Francisco, Cal.	do	348 0	69 3	24 0	10,288
Iowa	Steel sea-going battle ship. 2 12″ barbette turrets. 4 8″ barbette turrets.	1893	Wm. Cramp & Sons, Philadelphia, Pa.	do	360 0	72 2½	24 0	11,410

vessels of the U. S. Navy.

VESSELS.

Type of engine.	Speed in knots per hour.	Maximum indicated horse power.	Tons per inch immersion at normal draft and displacement.	Normal coal supply.	Bunker capacity.	Maximum draft aft at lowest point of keel. Ship ready for sea, bunkers full.	
			Tons.	*Tons.*	*Tons.*	*Ft.*	*In.*
Twin screw horizontal compound	12.4	3,700	33.64	400	410	18	3
Twin screw inclined compound	12	1,600	27.67	250	250	14	7½
Twin screw horizontal triple expansion	14.5	3,000	27.67	250	250	14	7½
Twin screw inclined compound	10.5	1,426	27.67	250	260	15	0
do	12	1,600	27.67	250	250	14	6½
Twin screw vertical triple expansion	13.6	5,244	26.74	200	236	15	4
do	17	9,000	32.32	400	896	22	11
do	21	17,401	39.50	750	1,290	26	8
do	20	16,000	41.19	900	1,753	26	2
do	17	4,800	19.16	175	192.70	16	0
do	17	8,000	30.22	500	850	23	8
do	15	9,000	43	400	1,640	27	1¾
do	15	9,000	43	400	1,640	27	1¾
do	15	9,000	43	400	1,640	27	1¾
do	16	11,000	45.95	625	1,780	26	9¾

APPENDIX E.—*Table of vessels*

ARMORED

Name	Batteries			Armor.		
	Main.	Secondary.	Torpedo tubes.	Sides.	Turrets.	Barbettes.
MONITORS.				*Inches.*	*Inches.*	*Inches.*
Puritan	4 12" B. L. R. 6 4" R. F. guns.	4 3-pdr. R. F. G. 4 37mm H. R. C. 4 Gatlings.		14	8	14
Amphitrite	4 10" B. L. R. 2 4" R. F. guns.	2 6-pdr. R. F 2 3-pdr. R. F. 2 37mm H. R. C.		9	7½	11½
Monadnock	4 10" B. L. R. 2 4" R. F. guns.	2 6-pdr. R. F 2 3-pdr. R. F. 2 37mm H. R. C.		9	7½	11½
Miantonomoh	4 10" B. L. R.	2 6-pdr. R. F. G. 2 3-pdr. R. F. G. 1 1-pdr. R. F. G.		7	11½	
Terror	4 10" B. L. R.	2 6-pdr. R. F. 2 3-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.		7	11½	
Monterey	2 12" B. L. R. 2 10" B. L. R.	6 6-pdr. R. F 4 1-pdr. R. F. 2 Gatlings.		13	For'd 8" Aft 7½".	For'd 14". Aft 11½".
ARMORED CRUISERS.						
Maine	4 10" B. L. R. 6 6" B. L. R	8 6-pdr. R. F 8 1-pdr. R. F. 4 Gatlings.	4	12	8	12
New York	6 8" B. L. R. 12 4" R. F guns.	8 6 pdr. R. F 4 1 pdr. R. F. 4 Gatlings.	3	4	5½	10
Brooklyn	8 8" B. L. R. 12 5" R. F. guns.	12 6-pdr. R. F. G. 4 1 pdr. R. F. 4 Gatlings.	5	3	5½	8 and 4
RAM.						
Katahdin		4 6-pdr. R. F		6		
BATTLE SHIPS.						
Texas	2 12" B. L. R. 6 6" B. L. R.	12 6-pdr. R. F 6 1-pdr. R. F. 4 37mm H. R. C. 2 Gatlings.	4	12	12	
Massachusetts	4 13" B. L. R. 8 8" B. L. R. 4 6" B. L. R.	20 6-pdr. R. F 6 1-pdr. R. F. 4 Gatlings.	6	18	15 6 6	17 8 6
Indiana	4 13" B. L. R. 8 8" B. L. R. 4 6" B. L. R	20 6-pdr. R. F 6 1-pdr. R. F. 4 Gatlings.	6	18	do	do
Oregon	4 13" B. L. R. 8 8" B. L. R. 4 6" B. L. R.	20 6-pdr. R. F 6 1-pdr. R. F. 4 Gatlings.	6	18	do	do
Iowa	4 12" B. L. R. 8 8" B. L. R. 6 4" R. F. guns.	20 6-pdr. R. F 6 1-pdr. R. F. 4 Gatlings.	6	14 3	15 5½	15 8 and 6

of the U. S. Navy—Continued.

VESSELS—Continued.

Protective deck.		Complement.		Cost of hull and machinery.	Date of act authorizing building or completion.
Slopes.	Flat.	Officers.	Men.		
Inches.	*Inches.*				
	2		195	Appropriation to complete, $3,178,046.	Mar. 3, 1885; Aug. 3, 1886; Mar. 3, 1887.
	1¾	26	145		Do.
	1¾	26	145		Do.
	1¾	13	136		Do.
	1¾		145		Do.
	3	19	172	*1,628,950	Mar. 3, 1887.
	2		370	†2,500,000	Mar. 3, 1887.
6	3	40	526	*2,985,000	Sept. 7, 1888.
6	3		501	*2,986,000	July 19, 1892.
			91	*930,000	Mar. 2, 1889.
	2	30	362	†2,500,000	Aug. 3, 1886.
	2¾		424	*3,020,000	June 30, 1890.
	2¾		424	*3,020,000	Do.
	2¾		424	*3,180,000	Do.
	2¾		444	*3,010,000	July 19, 1892.

*Contract price. †Limit of cost.

APPENDIX E.—*Table of vessels*

SINGLE-TURRET

Name.	Type.	Keel laid.	By whom and where built.	Condition.	Dimensions.			Displacement.	Indicated horse power.
					Length between perpendiculars.	Breadth.	Mean draft.		
					Feet.	*Ft. In*	*Ft. In*	*Tons.*	
Ajax	Low free board single-turret monitor.	1862	Snowdon & Mason, Pittsburg, Pa.	In ordinary, near Richmond.	225	43 8	13 6	2,100	340
Comanche	....do	1862	Donahue, Ryan & Secor, Jersey City, N.J.	In ordinary, Mare Island, Cal.	200	46 0	11 6	1,875	340
Canonicus	....do	1862	Harrison Loring, Boston, Mass.	In ordinary, near Richmond.	225	43 8	13 6	2,100	340
Catskill	....do	1862	John Ericsson, Brooklyn, N. Y.	....do	200	46 0	11 6	1,875	340
Jason	....do	1862	John Ericsson, Chester, Pa.	In ordinary, League Island, Pa.	200	46 0	11 6	1,875	340
Lehigh	....do	1862	....do	In ordinary, near Richmond.	200	46 0	11 6	1,875	340
Mahopac	....do	1862	Z. and F. Secor, Jersey City, N.J.	....do	225	43 8	13 6	2,100	340
Manhattan	....do	1862	Perine, Secor & Co., Jersey City, N. J.	....do	225	43 8	13 6	2,100	340
Montauk	....do	1862	John Ericsson, Brooklyn, N. Y.	In ordinary, League Island, Pa.	200	46 0	11 6	1,875	340
Nahant	....do	1862	Harrison Loring, Boston, Mass.	....do	200	46 0	11 6	1,875	340
Nantucket	....do	1862	Atlantic Works, Boston, Mass.	Southport, N. C., for use of Naval Reserves.	200	46 0	11 6	1,875	340
Passaic	....do	1862	John Ericsson, Brooklyn, N. Y.	Boston, Mass. For use of Naval Reserves.	200	46 0	11 6	1,875	340
Wyandotte	....do	1862	Miles Greenwood, Cincinnati, Ohio.	Ordered to Baltimore, Md., for use of Naval Reserves.	225	43 8	13 6	2,100	340

of the U. S. Navy—Continued.

MONITORS (IRON).

Type of engine.	Speed in knots.	Batteries.		Armor.		Cost of hull and machinery.	Date of act authorizing building.
		Main.	Secondary.	Sides.	Turret.		
				Ins.	*Ins.*		
Single-screw grasshopper.	5 to 6	2 XV"S. B.	None	5	10	$626,582.24	Apr. 17, 1862.
do	5 to 6	None	do	5	11	613,164.98	Do.
do	6	2 XV"S. B.	2 12-pdr. H.	5	10	622,963.22	Do.
do	6	do	None	5	11	427,766.78	Do.
do	5 to 6	do	do	5	11	422,766.73	Do.
do	5 to 6	do	do	5	11	422,726.28	Do.
do	6	do	do	5	10	635,374.55	Do.
do	6	do	do	5	10	628,879.27	Do.
do	5 to 6	do	do	5	11	423,027.49	Do.
do	5 to 6	do	do	5	11	413,515.14	Do.
do	5 to 7	do	do	5	11	408,091.37	Do.
do	5 to 6	do	1 12-pdr. H.	5	11	423,171.69	Do.
do	6	do	do	5	10	633,327.84	Do.

APPENDIX E.—*Table of vessels*

UNARMORED

Name.	Type.	Keel laid.	By whom and where built or building.	Condition or service.	Ship fully equipped ready for sea, all stores on board. Normal coal supply.			
					Length on load water line.	Extreme breadth.	Mean draft.	Displacement.
					Ft. In.	*Ft. In.*	*Ft. In.*	*Tons.*
Chicago	Protected cruiser	1883	John Roach & Sons, Chester, Pa.	Flagship, European station.	325 0	48 2	19 0	4,500
Boston	....do	1883	....do	Pacific station.	271 3	42 1¾	16 10	3,000
Atlanta	....do	1883	....do	North Atlantic station.	271 3	42 1¾	16 10	3,000
Dolphin	Dispatch boat.	1883	....do	Special service.	240 0	32 0	14 3	1,486
Newark	Protected cruiser.	1887	Wm. Cramp & Sons, Philadelphia, Pa.	Flagship, South Atlantic station.	310 0	49 2	18 9	4,098
Charleston	....do	1887	Union Iron Works, San Francisco, Cal.	Asiatic station.	312 7	46 2	18 7	3,730
Baltimore	....do	1887	Wm. Cramp & Sons, Philadelphia, Pa.	Flagship, Asiatic station.	327 6	48 7½	19 6	4,413
San Francisco	....do	1888	Union Iron Works, San Francisco, Cal.	North Atlantic station.	310 0	49 2	18 9	4,098
Philadelphia	....do	1888	Wm. Cramp & Sons, Philadelphia, Pa.	Flagship, Pacific station.	327 6	48 7½	19 2½	4,324
Olympia	....do	1890	Union Iron Works, San Francisco, Cal.	Building	340 0	53 0¾	21 6	5,870
Cincinnati	....do	1890	U. S. navy-yard, Brooklyn, N. Y.	In commission, not assigned.	300 0	42 0	18 0	3,213
Raleigh	....do	1889	U. S. navy-yard, Norfolk, Va.	....do	300 0	42 0	18 0	3,213
Montgomery	Cruiser	1890	Columbian Iron Works, Baltimore, Md.	....do	257 0	37 0	14 7	2,094
Detroit	....do	1890	....do	Asiatic station.	257 0	37 0	14 7	2,094
Marblehead	....do	1890	City Point Works, Boston, Mass.	North Atlantic station.	257 0	37 0	14 7	2,089
Columbia	Protected cruiser.	1890	Wm. Cramp & Sons, Philadelphia, Pa.	....do	412 0	58 2¼	22 6½	7,375
Minneapolis	....do	1891	....do	Building	412 0	58 2¼	22 6½	7,375

of the U. S. Navy—Continued.

STEEL VESSELS.

Type of engine.	Speed in knots per hour.	Maximum indicated horse power.	Tons per inch immersion at normal draft and displacement.	Normal coal supply.	Bunker capacity.	Maximum draft at lowest point of keel. Ship ready for sea, bunkers full.
				Tons.	*Tons.*	*Ft. In.*
Twin screw compound overhead beam	15.10	5,084	26.92	.....	831.94	22 6½
Single screw horizontal compound	15.60	4,030	20.03	.....	495.80	21 ¾
do	15.60	4,030	20.03	.....	490	21 [illegible]
Single screw vertical compound	15.50	2,253	13.31	.....	273.74	17 1½
Twin screw horizontal triple expansion	19	8,869	25	400	809.46	22 7½
Twin screw horizontal compound	18.20	6,666	23	328	757.70	21 8½
Twin screw horizontal triple expansion	20.096	10,064	25.89	400	1,143.87	23 11½
do	19.525	9,913	25	350	627.76	22 3½
do	19.678	8,815	25.89	400	1,031.51	23 5
Twin screw vertical triple expansion	21.686	17,313	29.36	400	1,093	24 9 11/16
do	19	10,000	20.04	350	460.09	20 2½
do	19	10,000	20.04	350	460.09	20 2½
do	19.05	5,527	15.75	200	340	16 1
do	18.71	5,227	15.75	200	340	16 1
do	18.44	5,451	15.75	200	340	16 1
Triple screw vertical triple expansion	22.8	18,509	36.87	750	1,670	26 7 3/16
do	23.073	20,493	36.87	750	1,670	26 7 3/16

APPENDIX E.—*Table of vessels*

UNARMORED STEEL

Name.	Batteries.			Protective deck.	
	Main.	Secondary.	Torpedo tubes.	Slopes.	Flat.
				Ins.	*Ins.*
Chicago	4 8″ B. L. R 8 6″ B. L. R. 2 5″ B. L. R.	10 6-pdr. R. F 4 1-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.		1½	1½
Boston	6 6″ B. L. R 2 8″ B. L. R.	2 6-pdr. R. F 2 3-pdr. R. F. 2 1-pdr. R. F. 2 47mm H. R. C. 2 37mm H. R. C. 2 Gatlings.		1½	1½
Atlanta	6 6″ B. L. R 2 8″ B. L. R.	2 6-pdr. R. F 2 3-pdr. R. F. 2 1-pdr. R. F. 2 47mm H. R. C. 2 37mm H. R. C. 2 Gatlings.		1½	1½
Dolphin	2 4″ R. F. guns	2 6-pdr. R. F 2 47mm H. R. C. 2 Gatlings.			
Newark	12 6″ B. L. R	4 6-pdr. R. F 4 3-pdr. R. F. 2 1-pdr. R. F. 3 37mm H. R. C. 4 Gatlings.	6	3	2
Charleston	2 8″ B. L. R 6 6″ B. L. R.	4 6-pdr. R. F 2 3-pdr. R. F. 2 1-pdr. R. F. 4 37mm H. R. C. 2 Gatlings.	4	3	2
Baltimore	4 8″ B. L. R 6 6″ B. L. R	4 6-pdr. R. F 2 3-pdr. R. F. 2 1-pdr. R. F. 4 37mm H. R. C. 2 Gatlings.	4	4	2½
San Francisco	12 6″ B. L. R	4 6-pdr. R. F 4 3-pdr. R. F. 2 1-pdr. R. F. 3 37mm H. R. C. 4 Gatlings.	6	3	2
Philadelphia	12 6″ B. L. R	4 6-pdr. R. F. 4 3-pdr. R. F. 2 1-pdr. R. F. 3 37mm H. R. C. 4 Gatlings.	4	4	2½
Olympia	10 5″ R. F. guns 4 8″ B. L. R.	14 6-pdr. R. F 6 1-pdr. R. F. 4 Gatlings.	6	4¾	2
Cincinnati	10 5″ R. F. guns 1 6″ R. F. gun.	8 6-pdr. R. F 4 1-pdr. R. F. 2 Gatlings.	4	2½	1
Raleigh	10 5″ R. F. guns 1 6″ R. F. gun.	8 6-pdr. R. F 4 1-pdr. R. F. 2 Gatlings.	4	2½	1
Montgomery	9 5″ R. F. guns	6 6-pdr. R. F 2 1-pdr. R. F. 2 Gatlings.	3	7/16	5/16
Detroit	9 5″ R. F. guns	6 6-pdr. R. F 2 1-pdr. R. F. 2 Gatlings.	3	7/16	5/16
Marblehead	9 5″ R. F. guns	6 6-pdr. R. F 2 1-pdr. R. F. 2 Gatlings.	3	7/16	5/16
Columbia	1 8″ B. L. R 2 6″ R. F. guns. 8 4″ R. F. guns.	12 6-pdr. R. F 4 1-pdr. R. F. 4 Gatlings.	5	4	2½
Minneapolis	1 8″ B. L. R 2 6″ R. F. guns. 8 4″ R. F. guns.	12 6-pdr. R. F 4 1-pdr. R. F. 4 Gatlings.	5	4	2½

of the U. S. Navy—Continued.

VESSELS—Continued.

Complement.		Cost of hull and machinery.	Date of act authorizing the building.	Contract signed.	Time to complete from date of contract.
Officers.	Men.				*Months.*
33	376	* $889,000	Mar. 3, 1883	July 26, 1883	.....
19	265	* 619,000	....do	....do	.....
19	265	* 617,000	....do	....do	.....
7	108	* 315,000	....do	....do	.....
34	350	* 1,248,000	Mar. 3, 1885	Oct. 27, 1887	24
20	280	* 1,017,000	....do	Dec. 28, 1886	18
36	350	* 1,325,000	Aug. 3, 1886	Dec. 17, 1886	18
33	350	* 1,428,000	Mar. 3, 1887	Oct. 26, 1887	24
34	350	* 1,325,000	....do	Oct. 27, 1887	24
.....	395	* 1,796,000	Sept. 7, 1888	July 10, 1890	Apr. 1, 1893
20	292	† 1,100,000	....do	.....	.....
20	292	† 1,100,000	....do	.....	.....
20	254	* 612,500	....do	Nov. 2, 1889	30
20	254	* 612,500	....do	....do	30
20	254	* 674,000	....do	Nov. 11, 1889	30
.....	429	* 2,725,000	June 30, 1890	Nov. 19, 1890	30
.....	456	* 2,690,000	Mar. 2, 1891	Aug. 31, 1891	24

* Contract price. † Limit of cost.

APPENDIX E.—*Table of vessels*

UNARMORED STEEL

Name.	Type.	Keel laid.	By whom and where built or building.	Condition or service.	Ship fully equipped ready for sea, all stores on board. Normal coal supply. Length on load water line.	Extreme breadth.	Mean draft.	Displacement.
GUNBOATS.					*Ft. In.*	*Ft. In.*	*Ft. In.*	*Tons.*
Petrel	Gunboat	1887	Columbian Iron Works, Baltimore, Md.	Asiatic station.	176 3	31 0	11 7	892
Yorktown	do	1887	Wm. Cramp & Sons, Philadelphia, Pa.	do	230 0	36 0	14 0	1,710
Concord	do	1888	N. F. Palmer & Co., Chester, Pa.	do	230 0	36 0	14 0	1,710
Bennington	do	1888	do	Pacific station.	230 0	36 0	14 0	1,710
Machias	do	1891	Bath Iron Works, Bath, Me.	Fitting out for Asiatic station.	204 0	32 1½	12 0	1,177
Castine	do	1891	do	Awaiting commission.	204 0	32 1½	12 0	1,177
Gunboat No. 7	Light-draft gunboat.	1894	Newport News Ship building and Dry Dock Co.	Building	220 0	38 3	11 0	1,371
Gunboat No. 8	do	1894	do	do	250 9	40 1¾	9 0	1,392
Gunboat No. 9	do	1894	do	do	250 9	40 1¾	9 0	1,392
SPECIAL CLASS.								
Vesuvius	Dynamite cruiser.	1887	Wm. Cramp & Sons, Philadelphia, Pa.	North Atlantic station.	252 4	26 6¾	10 7½	929
Bancroft	For naval cadets.	1891	Moore & Sons, Elizabethport, N. J.	Naval Academy.	187 6	32 0	11 6	839
Torpedo cruiser				Subject to orders from the Department.				
TORPEDO BOATS.								
Stilletto	Wood torpedo boat.		Purchased from Herreschoff M'f'g Co.	Torpedo practice, Newport, R. I.	88 6	11 0	3 0	31
Cushing	Steel torpedo boat.	1889	Herreschoff M'f'g Co., Bristol, R. I.	Special service.	138 9	14 3	4 10¾	105
Ericsson	do	1892	Iowa Iron Works, Dubuque, Iowa.	Awaiting commission.	149 7	15 6	4 9	120
Torpedo boat No. 3.	do		Contract not yet awarded.		160 0	16 0¾	5 0	142
Torpedo boat No. 4.	do		do		160 0	16 0¾	5 0	142
Torpedo boat No. 5.	do		do		160 0	16 0¾	5 0	142

of the U. S. Navy—Continued.

VESSELS—Continued.

Type of engine.	Speed in knots per hour.	Maximum indicated horse power.	Tons per inch immersion at normal draft and displacement.	Normal coal supply.	Bunker capacity.	Maximum draft aft at lowest point of keel. Ship ready for sea, bunkers full.
				Tons.	*Tons.*	*Ft. In.*
Single screw horizontal compound	11.79	1,095	9.28	100	200	13 1
Twin screw horizontal triple expansion	16.14	3,392	13.72	200	380	16 7
do	17.0	3,405	13.72	200	401	16 7
do	17.5	3,436	13.72	200	403	16 7
Twin screw vertical triple expansion	15.46	1,873	10.84	125	192.6	14 0
do	16.032	2,199	10.84	125	192.6	14 0
Twin screw vertical quadruple expansion.	14	1,750	13.16	150	399.31	12 7½
Twin screw vertical triple expansion	13	1,600	17.08	100	279.73	9 9¾
do	13	1,600	17.08	100	279.73	9 9¾
do	21.42	3,794.86	10.65	.....	152.2	11 2½
do	14.37	1,213	9.52	100	203	12 11
.....	.....	.....	.....	.....	.....	.....
Single screw vertical	18.22	359	.....	.....	.....	.....
Twin screw vertical quadruple expansion.	22.5	1,720	3.10	.....	36	5 6
do	24.00	1,800	3.56	9	35.40	5 6½
do	24.5	2,000	4.07	9	42	5 8
do	24.5	2,000	4.07	9	42	5 8
do	24.5	2,000	4.07	9	42	5 8

APPENDIX E.—*Table of vessels*

UNARMORED STEEL

Name.	Batteries.			Protective deck.	
	Main.	Secondary.	Torpedo tubes.	Slopes.	Flat.
GUNBOATS.				*Inches.*	*Inches.*
Petrel	4 6″ B. L. R	2 3-pdr. R. F 1 1-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.		$\frac{3}{8}$	$\frac{5}{16}$
Yorktown	6 6″ B. L. R	2 6-pdr. R. F. 2 3-pdr. R. F. 1 1-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.	6	$\frac{3}{8}$	$\frac{3}{8}$
Concord	6 6″ B. L. R	2 6-pdr. R. F 2 3-pdr. R. F. 1 1-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.	6	$\frac{3}{8}$	$\frac{3}{8}$
Bennington	6 6″ B. L. R	2 6-pdr. R. F 2 3-pdr. R. F. 1 1-pdr. R. F. 2 37mm H. R. C. 2 Gatlings.	6	$\frac{3}{8}$	$\frac{3}{8}$
Machias	8 4″ R. F. guns	4 6-pdr. R. F 2 1-pdr. R. F. 2 Gatlings.	1	$\frac{3}{8}$	$\frac{5}{16}$
Castine	8 4″ R. F. guns	4 6-pdr. R. F. G. 2 1-pdr. R. F. G. 2 Gatlings.	1	$\frac{3}{8}$	$\frac{5}{16}$
Gunboat No. 7	8 4″ R. F. guns	4 6-pdr. R. F. G. 2 1-pdr. R. F. G. 2 Gatlings.		$\frac{3}{8}$	$\frac{5}{16}$
Gunboat No. 8	8 4″ R. F. guns	2 6-pdr. R. F. G. 4 1-pdr. R. F. G. 2 Gatlings.		$\frac{3}{8}$	$\frac{5}{16}$
Gunboat No. 9	8 4″ R. F. Guns	2 6 pdr. R. F. G. 4 1 pdr. R. F. G. 2 Gattlings		$\frac{3}{8}$	$\frac{5}{16}$
SPECIAL CLASS.					
Vesuvius	3 dynamite guns, 15″ cal.	3 3-pdr. R. F		$\frac{3}{16}$	$\frac{3}{16}$
Bancroft	4 4″ R. F. guns	2 6-pdr. R. F 2 3-pdr. R. F. 1 1-pdr. R. F. 1 37mm H. R. C. 1 Gatling.	2	$\frac{5}{16}$	$\frac{1}{4}$
Torpedo cruiser					
TORPEDO BOATS.					
Stiletto					
Cushing		3 1-pdr. R. F	3 18″ Whitehead torpedo tubes.		
Ericsson		3 1-pdr. R. F	3 18″ Whitehead torpedo tubes.		
Torpedo boat No. 3		3 1-pdr. R. F	3 18″ Whitehead torpedo tubes.		
Torpedo boat No. 4		3 1-pdr. R. F	3 18″ Whitehead torpedo tubes.		
Torpedo boat No. 5		3 1-pdr. R. F	3 18″ Whitehead torpedo tubes.		

of the U. S. Navy—Continued.

VESSELS—Continued.

Complement.		Cost of hull and machinery.	Date of act authorizing the building.	Contract signed.	Time to complete from date of contract.
Officers.	Men.				
					Months.
10	122	*$247,000	Mar. 3, 1885	Dec. 22, 1886	12
14	178	*455,000	....do	Jan. 31, 1887	12
13	180	*490,000	Mar. 3, 1887	Nov. 15, 1887	18
16	181	*490,000	....do	....do	18
11	143	*318,000	Mar. 2, 1889	Apr. 12, 1890	24
11	143	*318,000	....do	....do	24
11	139	280,000	Mar. 3, 1893	Jan. 22, 1894	24
11	139	280,000	....do	Jan. 29, 1894	24
11	139	280,000	....do	....do	24
6	64	*350,000	Aug. 3, 1886	Feb. 11, 1887	12
10	120	*250,000	Sept. 7, 1888	July 18, 1890	24
.....	.....	.....	.....	.....	.....
.....	.....	†25,000	.....	.....	.....
3	20	*82,750	Mar. 3, 1887	Mar. 1, 1888	15
3	20	*113,500	June 30, 1890	Oct. 8, 1891	12
4	16	.....	July 26, 1894	.....	12
4	16	.....	July 26, 1894	.....	12
4	16	.....	July 26, 1894	.....	12

* Contract price. † Limit of cost.

APPENDIX E.—*Table of vessels*

IRON AND WOODEN

Name.	Built.			Condition or service.	Rig.
	When.	Where.	By whom.		
IRON.					
Ranger	1873-1876	Wilmington, Del.	Harlan & Hollingsworth.	Pacific station	Bark
Alert	1873-1875	Chester, Pa.	John Roach	do	do
Monocacy	1863	Baltimore, Md	A. & W. Denmead & Son.	Asiatic station	Schooner
Michigan	1844	Erie, Pa	United States	Special service North-western lakes.	Barkentine
Pinta	1865	Chester, Pa	Reany, Son & Archbold.	Special service	Schooner
Alarm	1874	New York, N. Y.	United States	In ordinary, at navy-yard, New York.	
WOODEN.					
Lancaster	1858	Philadelphia, Pa.	do	Fitting out as gunnery training ship.	Ship
Pensacola	1858-1862	Pensacola, Fla.	do	In ordinary, at navy-yard, Mare Island.	do
Hartford*	1858	Boston, Mass	do	Rebuilding	Bark
Richmond	1858	Norfolk, Va.	do	Receiving ship navy-yard, League Island, Pa	do
Omaha	1867-1869	Philadelphia, Pa.	do	In ordinary at navy-yard, Mare Island.	Bark
Swatara	1872	New York, N. Y.	do	do	Ship
Marion	1871-1875	Kittery, Me.	do	Navy-yard, Mare Island, Cal.	Bark
Mohican	1872-1883	Mare Island, Cal.	do	Pacific station	do
Iroquois	1858	New York, N. Y.	do	In ordinary, at navy-yard, Mare Island.	Ship
Adams	1874-1876	Boston, Mass	United States and Donald McKay.	Pacific station	do
Alliance	1873-1876	Norfolk, Va.	United States	Navy-yard, Norfolk, Va.	do
Essex	1874-1876	Kittery and Boston.	United States and Donald McKay.	Training ship	do
Enterprise	1873-1876	Kittery, Me.	John W. Griffith and United States.	Nautical school ship, Boston, Mass.	do
Nipsic	1873-1879	Washington, D.C.	United States	Naval station, Puget Sound.	do
Yantic	1864	Philadelphia, Pa.	do	South Atlantic station.	Bark
Thetis		Dundee, Scotland.	Alex. Stevens & Sons.	Special service	do

* To be refitted with new machinery and modern battery.

of the U. S. Navy—Continued.

STEAM VESSELS.

Dimensions.			Displacement.	Indicated horse power.	Speed in knots per hour.	Batteries.		Bunker capacity.	Complement.	
Length between perpendiculars.	Breadth.	Mean draft.				Main.	Secondary.		Officers.	Men.
Ft. In	*Ft. In*	*Ft. In*	*Tons.*					*Tons.*		
175 0	32 0	12 9	1,020	365	10	2 IX" S. B 1 VIII" M. L. R. 1 60-pdr. B. L. R.	1 3" B. L. H 2 37mm H. R. C. 1 Gatling.	*126	21	127
175 0	32 0	12 9	1,020	365	10	2 IX" S. B 1 XI" S. B. 1 60-pdr. B. L. R.	2 6-pdr 1 12-pdr. S. B. howtz. 1 Gatling.	*133	21	127
255 0	35 0	9 0	1,370	850	11.2	4 VIII" S. B 2 60-pdr. B. L. R.	1 3" B. L. H 1 12-pdr. S. B. howtz. 6 37mm H. R. C. 2 47mm H. R. C. 1 Gatling	†224	12	114
163 3	27 1½	9 0	685	305	10.5	4 30-pdr. B. L. R.	3 3" B. L. H 2 Gatlings.	*135	.....	.....
137 0	26 0	10 0	550	190	8.5	4 12-pdr. S. B. howtz	1 Gatling	*111	8	37
158 6	28 0	10 6	800	600	10	.....	.....	*405	.....	.....
235 8	46 0	19 2	3,250	733	9.6	Battery landed	Battery landed	†288	.....	.....
230 8	44 6	18 7	3,000	680	9	....do	....do	*285	.....	.....
225 0	44 0	18 2	2,790	2,000	12	13 5" R. F. G	4 6-pdr. R. F. G 2 16-pdr. R. F. G.	*286	32	285
225 0	42 6	17 4½	2,700	692	9.5	12 IX" S. B 1 8" M. L. R. 1 60-pdr. B. L. R.	2 20-pdr. B. L. R. 1 3" B. L. R. 2 37mm H. R. C. 1 Gatling.	†265	29	321
250 6	38 0	16 6	2,400	953	11.3	.....	Battery landed	.....	.....	.....
216 0	37 0	16 6	1,900	680	10.1	.....	....do	.....	.....	.....
216 0	37 0	16 6	1,900	753	11.25	1 8" M. L. R. 6 IX" S. B. 1 60-pdr. B. L. R.	2 20-pdr. B. L. R. 1 3" B. L. H. 2 37mm H. R. C. 1 Gatling.	*135	18	176
216 0	37 0	16 6	1,900	613	10.65	8 IX" S. B 1 8" M. L. R. 1 60-pdr. B. L. R.	2 20-pdr. B. L. R. 1 3" B. L. H. 1 12-pdr. S. B. howtz. 2 37mm H. R. C. 1 Gatling.	*162	1	193
198 10	33 10	15 3	1,575	1,202	10.7	Battery landed	Battery landed	*128	.....	.....
185 0	35 0	14 3	1,375	550	9.8	4 IX" S. B. 1 8" M. L. R. 1 60-pdr. M. L. R.	1 3" B. L. H 2 37mm H. R. C. 1 Gatling.	*150	20	160
185 0	35 0	14 3	1,375	668	9.98	8 4" R. F. G	4 6-pdr. R. F. G 2 1-pdr. R. F. G.	*150	18	160
185 0	35 0	14 3	1,375	505	10.4	8 4" R. F. G.	4 6-pdr. R. F. G 2 1-pdr. R. F. G.	†130	15	170
185 0	35 0	14 3	1,375	790	11.4	4 IX" S. B. 1 8" M. L. R. 1 60-pdr. B. L. R.	2 3" B. L. H 1 37mm H. R. C. 1 Gatling.	*130	.....	.....
185 0	35 0	14 3	1,375	839	10.7	.....	Battery landed	†132	.....	.....
180 0	30 0	12 2	900	225	8.30	2 IX" S. B. 1 8" M. L. R. 1 60-pdr. B. L. R	1 12-pdr. S. B. howtz 1 Gatling. 1 3" B. L. H.	*117	20	134
166 0	30 3	18 0	1,250	490	7.55	.....	1 53mm H. R. C	300	10	98

* Anthracite. † Bituminous.

APPENDIX E.—*Table of vessels*

WOODEN SAIL

Name.	Built.			Condition or service.	Rig.
	When.	Where.	By whom.		
Constellation	1854	Norfolk, Va	United States	Receiving ship for apprentices, Newport, R. I.	Ship
Monongahela	1862	Philadelphia, Pa	do	Training squadron	Bark
Portsmouth	1843	Kittery, Me	do	do	Ship
Jamestown	1845	Norfolk, Va	do	Hospital ship	do
Saratoga	1842	Kittery, Me	do	Nautical school ship, Philadelphia, Pa.	do
St. Mary's	1844	Washington, D.C.	do	Nautical school ship, New York.	do

STEEL, IRON, AND

Name.	Built.			Material.
	When.	Where.	By whom.	
Fortune	1865	Boston	John Tetlow	Iron
Leyden	1866	do	James Tetlow	do
Nina	1865	Chester	Reany, Son & Archbold.	do
Rocket	1863		Purchased	Wood
Standish	1865	Boston	James Tetlow	Iron
Triton	1888	Camden, N. J	John H. Dialogue	Steel
Iwana	1891	Boston	City Point Iron W'ks	do
Wahneta	1891	do	do	do
Narkeeta	1891	do	do	do
Tug-boat No. 4	1894	Mare Island, Cal.	Government	do
Traffic	1891	South Brooklyn, N. Y.	D. McCarty	Wood

of the U. S. Navy—Continued.

ING VESSELS.

Dimensions.				Speed in knots per hour.	Batteries.		Complement.	
Length between perpendiculars.	Breadth.	Mean draft.	Displacement.		Main.	Secondary.	Officers.	Men.
Ft. In.	*Ft. In.*	*Ft. In.*	*Tons.*					
176 0	42 0	20 0	1,186	.....	8 VIII″ S. B.	2 20-pdr. B. L. R	15	203
223 0	38 0	16 6	2,100	.....	6 VIII″ S. B.	1 3″ B. L. H 1 6-pdr. R. F. G 4 37mm H. R. C	21	380
153 0	38 3	16 6	1,125	.....	11 VIII″ S. B. 1 60-pdr. B. L. R.	2 20-pdr. B. L. R 1 3″ B. L. R. 1 Gattling	15	210
163 6	36 0	16 0	1,150	.....	.....	.....	.....	.....
147 6	36 1	16 0	1,025	.....	.....	.....	.....	.....
150 0	37 6	15 6	1,025	.....	.....	.....	.....	.....

WOODEN STEAM TUGS.

Rig.	Dimensions.			Displacement.	Indicated horse power.	Speed in knots.	Coal capacity.
	Length between perpendiculars.	Breadth.	Mean draft.				
	Feet. In.	*Feet. In.*	*Feet. In.*	*Tons.*			*Tons.*
Schooner	137 0	26 0	9 6	450	340	10	80
do	137 0	26 0	9 6	450	340	10	80
do	137 0	26 0	8 6	357	388	11.12	80
.....	85 8	18 10	7 0	187	147	8.5	.....
Schooner	137 0	26 0	9 6	450	340	10	80
.....	96 9	20 9	9 0	212	300	13	45
.....	92 6	20 11⅜	8 0	192.4	300	11.5	35
.....	92 6	20 11⅜	8 0	192.4	300	11.5	35
.....	92 6	20 11⅜	8 0	192.4	300	11.5	35
Schooner	110 0	25	9 6¼	345	500	12	65
Derrick mast	106 0	29 4	9 0	280	.....	10	.....

APPENDIX E.—*Table of vessels*

VESSELS UNFIT

Name.	Built.			Condition or service.	Rig or type.
	When.	Where.	By whom.		
WOODEN (STEAM).					
Franklin	1855-'65	Kittery, Me.	United States	Receiving ship, Norfolk, Va.	Housed over
Wabash	1854	Philadelphia, Pa.	do	Receiving ship, Boston, Mass.	do
Minnesota	1855	Washington, D. C.	do	Receiving ship for training squadron, New York, N. Y.	do
SAILING.					
Constitution	1797	Boston, Mass.	United States	Receiving ship, Portsmouth, N. H.	Housed over
Independence	1837	do	do	Receiving ship, Mare Island, Cal.	do
St. Louis	1828	Washington, D. C.	do	For use Naval Reserves, Philadelphia, Pa.	do
Dale	1839	Philadelphia, Pa.	do	Receiving ship, Washington, D. C.	do
New Hampshire	1818	Kittery, Me.	do	For use of Naval Reserves, New York, N. Y.	Ship
Vermont	1818	Boston, Mass.	do	Receiving ship, New York, N. Y.	Housed over

of the U. S. Navy—Continued.

FOR SEA SERVICE.

Dimensions.			Displacement.	Indicated horse power.	Speed in knots per hour.	Batteries.		Coal capacity.	Complement.	
Length between perpendiculars	Breadth.	Mean draft.				Main.	Secondary.		Officers.	Men.
Ft. In.	*Ft. In.*	*Ft. In.*	*Tons.*					*Tons.*		
365 9	54 3	24 3	5,170	1,050	9.0	4 IX″ S. B.	1 12-pdr. S. B. hwtzr.	.....	.....	.....
262 7	51 4	23 0	4,650	950	9.15	.....	2 20-pdr. B. L. R. 2 12-pdr. S. B. hwtzr.	.....	.....	.....
264 8½	51 4	23 0	4,700	1,000	9.25	8 IX″ S. B. 1 60-pdr. B. L. R.	2 3″ B. L. H. 2 20-pdr. B. L. R. 3 12-pdr. S. B. hwtzr.	.....	.....	.....
175 0	45 0	20 0	2,200	.....	.....	4 32-pdr. S. B.	1 12-pdr. S. B. hwtzr.	.....	.....	.....
189 0	51 6	21 6	3,270	.....	.....	6 32-pdr. S. B.	3 12-pdr. S. B. (light) 1 12-pdr. S. B. (heavy) 1 3″ B. L. H.	.....	.....	.....
126 6	32 8	15 6	830	.....	.....	.....	.....	.....	.....	.....
117 7	33 10	14 9	675	.....	.....	.....	1 37mm H. R. C.	.....	.....	.....
196 3	53 0	25 6	4,150	.....	.....	.....	.....	.....	.....	.....
196 3	53 0	25 6	4,150	.....	.....	1 6″ B. L. R.	1 6-pdr. R. F. G. 1 3-pdr. R. F. G. 1 1-pdr. R. F. G. 1 37mm H. R. C. 9 12-pdr. S. B. H.	.....	.....	.....

APPENDIX F.

U. S. NAVY-YARD,
New York, September 26, 1894.

SIR: In compliance with paragraph 4 of the Bureau of Construction and Repair letter, No. 7500-94 of June 12, 1894, I have to submit report of the construction work done upon each ship under construction at this yard from July 1, 1893, to June 30, 1894, inclusive. There is also appended, in compliance with paragraph 5 of the same letter, a tabulated statement giving for each vessel upon which repair work was done during the year the information called for therein.

Very respectfully,

F. L. FERNALD,
Naval Constructor, U. S. Navy.

The COMMANDANT, NAVY-YARD, NEW YORK.

Statement showing the vessels on which repair work has been ordered between July 1, 1893, and June 30, 1894.

Name of vessel.	Work ordered.	Work begun.	Work completed.	Progress in tenths.	Estimated date of completion.
U S S. Destroyer	June 20, 1893	July 7, 1893	July 14, 1893	.....	
U. S. S. Dolphin	June 13, 1893	June 13, 1893	July 12, 1893	.....	
Do	Sept. 8, 1893	Sept. 8, 1893	Oct. 26, 1893	.....	
Do	Dec. 5, 1893	Dec. 8, 1893	Jan. 10, 1893	.....	
U. S. S. Vesuvius	Sept. 19, 1893	Sept. 20, 1893	Oct. 5, 1893	.....	
Do	Oct. 28, 1893	Oct. 30, 1893	Jan. 24, 1894	.....	
Do	May 23, 1894	May 24, 1894	Jan. 20, 1894	.....	
U S S Baltimore	May 20, 1893	May 24, 1893	Sept. 28, 1893	.....	
U S S Yorktown	May 18, 1893	May 19, 1893	July 27, 1893	.....	
U S S Vermont	June 13, 1893	June 14, 1893	May 7, 1894	.....	
U. S. S Portsmouth	Nov. 1, 1893	Nov. 1, 1893	Nov. 29, 1893	.....	
Do	Jan. 30, 1894	Apr. 21, 1894	June 23, 1894	.....	
U. S. S Fern	Aug. 10, 1893	Aug. 10, 1893	Sept. 15, 1893	.....	
U. S. S Minnesota	Feb. 2, 1894	Feb. 3, 1894	Apr. 2, 1894	.....	
Do	May 5, 1894	May 7, 1894	.....	$\frac{5}{10}$	Sept. 1, 1894
U. S. S. Bennington	Apr. 26, 1893	May 4, 1893	Nov. 22, 1893	.....	
U. S. S. Bancroft	May 31, 1893	June 10, 1893	July 26, 1894	.....	
U. S. S. New York	Oct. 4, 1893	Oct. 11, 1893	June 31, 1894	.....	
U. S. S. Monongahela	June 21, 1893	June 21, 1893	Aug. 21, 1893	.....	
U. S. S. St. Marys	Mar. 3, 1893	Mar. 7, 1893	Aug. 26, 1893	.....	
U. S. S. Nantucket	June 2, 1893	June 5, 1893	Aug. 24, 1893	.....	
U. S. S. San Francisco	Sept. 14, 1893	Sept. 18, 1893	Oct. 6, 1893	.....	
U. S. S. Miantonomoh	Sept. 6, 1893	Oct. 17, 1893	June 6, 1894	.....	
Do	June 9, 1894	June 13, 1894	.....	$\frac{1}{10}$	Oct. 6, 1894
U. S. S. Narkeeta	June 23, 1893	June 24, 1893	Jan. 23, 1894	.....	
U. S. S. Nina	Sept. 7, 1893	Sept. 7, 1893	Sept. 9, 1893	.....	
Do	Aug. 17, 1892	Oct. 14, 1893	.....	$\frac{1}{10}$	Aug. 30, 1894
U. S. S. Traffic	June 27, 1893	June 28, 1893	Apr. 25, 1894	.....	
U. S. S. Fortune	Dec. 28 1893	Dec. 28, 1893	Dec. 30, 1893	.....	
U. S. S. Marblehead	July 1, 1893	July 8, 1893	June 6, 1894	.....	
Do	May 2, 1894	June 26, 1894	.....	$\frac{1}{10}$	Sept. 15, 1894
U. S. S. Machias	Oct. 31, 1893	Nov. 2, 1893	.....	$\frac{1}{10}$	Oct. 1, 1894
U. S. S. Castine	Feb. 2, 1894	Feb. 8, 1894	.....	$\frac{1}{10}$	Oct. 15, 1894

MAINE.

Work completed or advanced during the year.—Side and barbette conning-tower armor. Life buoy. Eyebolts for davit guys. Anchor chains, hawse bucklers, etc. Fittings for sheet and bar anchors. Torpedo ports; gun-port shutters. Accommodation ladders. Voice-tube system; storeroom fittings. Steering gear; water-tight doors; armored hatches. Framing, flushing, and drainage system. Ventilation system; engine and boiler room gratings. Joiner work; awning stanchions and guard rails. Roller paths and rollers for turrets. Boat cranes; skylights between forward and amidship superstructure. Chart house. Hatch canopy and fittings; workshop and wash-room fittings. Mess lockers; cement outside; completing furniture, blocks, cooperage, and boats. Berth-deck planing.

It is estimated that 98 per cent of the work is completed, based upon the final completion of the vessel and outfit ready for sea. The trial trip can probably take place about October 1. The final completion of the ship will be about four months after the delivery of the turret armor.

CINCINNATI.

Work completed or advanced during the year.—Sponson armor; life buoys; danger booms; eyebolts for davit guys; anchor chains; plates in wake of sponsons; hammock berthing and bridge; all anchor fittings; port shutters; torpedo ports and fittings; water-tight bulkheads around boilers; fire-room air locks; stateroom and magazine fittings and gratings; water-tight doors; flushing and drainage system; ventilation system; skid beams; boat cradles and carriages; engine-room gratings and canopies; deck planking; firemen's wash room and skylights; drum-room gratings; steam winch and foundation; engine-room and fire-room hatch casings; evaporator room; heads and head tanks; sheet and bar anchor fittings; hand rails; search-light platform; chain plates; conning tower; navigator's office; mess lockers; bag racks; hatch gratings; sponson air ports; central station; refrigerator room; ventilation system; steering gear; boats, blocks, furniture, spars, and cooperage completed and put in place; painting, cementing, and general fittings. Ship in commission.

PURITAN.

Work completed or advanced during the year.—Barbette armor; smoke pipe and ventilating armor. Framing and plating of superstructure; joiner work in superstructure. Flushing and drainage system; ventilation system. Steering gear; roller paths; rollers for turrets. Base of turrets; berth-deck planking. Replacing boats transferred to other ships.

It is estimated that 85 per cent of the work is completed, based upon the final completion of the vessel and outfit ready for sea. The ship will be completed and ready in all respects for trial or service six months after the delivery of the armor.

TERROR.

Work completed or advanced during the year.—Side armor; chain pipes; framing and plating for manhole covers; magazine and stateroom fittings. Flushing and drainage system; voice tubes; mast boom. Boat davits; hatch coamings and gratings. Main and berth deck planking; deck lights; coaling scuttle; water-tight doors; joiner work. Replacing boats transferred to other ships. Completing blocks and furniture.

It is estimated that 92 per cent of the work is completed, based upon the final completion of the vessel and outfit ready for sea. The ship will be completed and ready in all respects for trial, or service, four months after delivery of sight hoods.

NAVY-YARD, *Norfolk, Va., July 9, 1894.*

SIR: In accordance with the letter of the Bureau of Construction and Repair, No. 7500-94, dated June 12, 1894, I have the honor to submit the following report showing—

1. Description of the work done on the *Texas*, *Amphitrite*, and *Raleigh* from July 1, 1893, to June 30, 1894, inclusive, the condition of the work at the latter date, and the estimated date of readiness for trial.

2. Tabular statement giving information as to repair work done at this yard from July 1, 1893, to June 30, 1894, inclusive. Photographs of the *Texas*, *Amphitrite*, and *Raleigh* will be taken, and the negatives with two prints of each forwarded as soon as possible.

U. S. S. TEXAS.

Items completed on or before July 1, 1894.—Keel, stem, sternpost, rudder, stern tubes and struts, longitudinals, transverse frames, diagonal armor bulkheads complete with armor; inner bottom, engine and boiler bearers, manholes, water-tight scuttles, deck beams to main deck—to protective deck—to lower deck and platforms; deck plating to lower deck and platforms, mast partners, stanchions, bilge keels, manger, draft figures, hatch coamings on platforms, capstan and windlass, wire nippers, anchor davits, cable bitts, hawse pipes, bow stoppers, and all anchor gear, deck pipes, ensign and jack staffs, zinc protectors, heeling ship after launch, cementing, mast steps.

The following statement shows the work done from July 1, 1893, to June 30, 1894, and the condition of work at the latter date:

Work done during year.	Condition June 30, 1894.
Armor side: Backing calked and painted; no armor received	Completed. Ship ready for armor.
Armor, redoubt: Two shutter plates received and secured, all flying beams, outside and deck plating secured.	Completed.
Turrets, tracks, racks, and clip rings secured; turrets placed in ship; backing fitted, armor received and secured; portholes fitted; splinter plates fitted; backing bolts, aprons, and securing chains fitted.	Reported ready to receive 12-inch guns and mounts, Dec. 15, 1893.
Transverse and coal bunker bulkheads: Secured parts left flying for redoubt armor.	Completed.
Outside plating: Finished riveting and fitting of plating to redoubt armor.	Do.
Ammunition hoists: Cut holes for ordnance fittings	Complete except ordnance fittings.
Deck beams: Secured all which had been left flying for redoubt armor and turrets.	Completed.
Deck plating. Secured all which had been left flying for redoubt armor and turrets	Do.
Deck planking. Secured all which had been left flying for redoubt armor and turrets.	Completed, except final calking and planing.
Hammock berthing: Riveted, cemented, and fitted hammock cloth backing and hooks.	Complete.
Hatch coamings: Finished those left flying for redoubt armor	Do.
Conning tower: Not received	Not begun.
Chart house and flying bridge: Finished as far as practicable in shops; it can not be erected until conning tower is secured.	Four-tenths complete; waiting for conning tower.
Steering apparatus: Adjusted steering engine and gear; hand-steering gear can not be completed until chart house is in place.	Eight-tenths complete; waiting for conning tower.
Passing scuttles: Finished those in central passage and after ammunition hoist room; fitted those in main and upper decks.	Complete.
Bitts. Secured those left flying for redoubt armor	Do.
Gun fittings: Secured 6-inch gun circles on main and upper decks, two forward 6-inch guns and shields on main deck secured; other fittings not received; no turret or rapid-fire gun fittings received except trucks in military tops.	Seven-tenths complete; waiting for fittings.
Central passage: Finished joiner work and water-tight door fittings; waiting for electric wires.	Completed, except electric wires.
12-inch magazines and shell room: Fitted and secured air-tight lining with enclosed air ducts, fitted and secured ammunition bins and trolley tracks in shell rooms.	Waiting for trolley track and turning tables and ordnance fittings.
6-inch and secondary ammunition rooms: Finished ventilation, cork-painted, fitted all bins and joiner work.	Complete.
Turret ammunition tubes: Secured in place	Do.
Ventilation: Finished cutting holes and fitting valves in magazines; completed one-half branch ducts; electrical blowers not received.	Eight-tenths complete.
Drainage and fire main: Main drainage system completed and in constant use; flushing system three-quarters finished; fire main one-half finished.	Do.
Skylights: Fitting all frames	Seven-tenths complete.
Air ports: Fitted and secured; eight left flying for redoubt armor	Complete.
Testing water-tight compartments: Tested central passage	Do.
Sounding tubes: Fitted flanges and indicator caps	Do.
Dynamo rooms: Fitted dynamo foundations; new doors; waiting for completion of electrical plant.	Nine-tenths complete.
Electric-lighting plant: Drilled holes and fitted backing where located.	Eight-tenths complete.
Electric storeroom: Painted and corked; waiting for arrangement of shelving, etc., from equipment.	Do.
Hydraulic rooms: Finished pump seats and fitted floors	Complete.
Shaft alleys: Completed riveting	Do.
Water-tight doors: Fitted brass strips and other minor fittings; protected rods in coal bunkers.	Do.
Ordinary doors: Finished minor fittings	Complete, except fitting locks.
Sluice valves: Completed indicators, minor fittings, and testing	Complete.
Torpedoes: Bow and stern, permanent tubes fitted complete; ordnance tubes now being fitted; broadside permanent, and ordnance tubes fitted complete; trolleys not received.	Nine-tenths complete.
Chain lockers: Cemented and fitted gratings	Complete.
Storerooms and fittings: Corked and painted one-half rooms; fittings completed; shelving, bins, ceiling, etc., one-third finished.	Seven-tenths complete.
Fresh-water system: Finished one-half piping	Four-tenths complete.
Canopies: Fitted those on after part of upper deck	Complete.
Guard rails and stanchions: Fitted three-quarters, and life-lines fitted complete.	Do.
Water tanks: Tested	Do.
Scuppers: Fitted all scuppers, pipes, and discharges	Do.
Coaling scuttles and ports: Cut all holes, fitted all castings and forgings.	Do.
Hammock hooks: Fitted all hooks	Do.
Cofferdams: Fitted all covers	Do.
Holes in bulkheads for engineers' pipes: Cut all that were required	Complete as far as laid off.
Companion ladders: Fitted on both sides	Complete.

Work done during year.	Condition June 30, 1894.
Sea steps: Fitted on both sides	Complete.
Ash chutes and trolley rails: Fitted complete	Do.
Washrooms: Fitted lockers, bath tubs, wash basins, etc	Nine-tenths complete.
Oil tanks: Begun	Two-tenths complete.
Steam winches: Secured in place	Nine-tenth complete.
Hatch cranes: Fitted where necessary	Complete.
Watch bell: Made and fitted	Do.
Swinging booms: Made and fitted	Do.
Voice pipes	Nine-tenths complete.
Boat cradles: Made and fitted for torpedo boats	Three-tenths complete.
Ladders: One-half made and fitted	Five-tenths complete.
Cementing: Finished nine-tenths cementing inside ship; cementing of outside plating two-tenths complete.	Six-tenths complete.
Painting: Painted and corked all ammunition rooms, one-half storerooms; painted redoubt armor and all new work, repainted five-tenths complete double bottoms, coal bunkers, and upper works.	Five-tenths complete.
Plumbing: Finished admiral's and captain's bathrooms; finished three-fourth officers' and crew's water-closets; pantries not begun; galleys half fitted.	Seven-tenths complete.
Label plates: Made and fitted nine-tenths	Nine-tenths complete.
Boats: Completed nine-tenths one whaleboat; eight-tenth two cutters; eight-tenths one gig; five-tenths one sailing launch; one-tenth one barge; four-tenths one dinghy.	Seven-tenths complete.
Torpedo boats: Finished three-fourths plans; both boats framed	One-tenth complete.
Bulkheads and fittings in officers' quarters; erected all bulkheads; completed six-tenths fittings.	Seven-tenths complete.
Furniture: Made and fitted seven-tenths	Do.
Docking: Ship docked and bottom painted once	
Final drawings: One-tenth made	One-tenth complete.

There is 93 per cent of the work completed, based on the final completion of the vessel and outfit ready for sea.

The date of the completion of the *Texas* depends upon the delivery of armor and ordnance material. The ship and outfit will be completed and ready for sea six months after they have been received.

Weights.

Department.	On board July 1, 1893.	Placed on board during year.	On board July 1, 1894.
Construction	6,059,662	453,237	6,512,899
Engineering	1,222,245	270,382	1,492,627
Ordnance	753,957	1,007,115	1,761,072
Equipment	28,139	17,907	46,046
Totals, pounds	8,064,003	1,748,641	9,812,644
Totals, tons	$3,600\frac{3}{2240}$	$780\frac{141}{2240}$	$4,380\frac{144}{2240}$

Draft of water July 1, 1894.

	Feet.	Inches.
Forward	16	1
Aft	18	5
Mean	17	3

U. S. S. AMPHITRITE.

Items completed on or before July 1, 1893.—All old work interfering with alterations torn out, old hatches closed, new ones cut, cutting out and closing old deck lights, main-deck plating, shutters and scuttles in main deck, berth-deck plating, transverse bulkheads, sluice valves and operating gear, manholes to double bottom, sounding tubes, stanchions, superstructure deck framing, beams and plating, skid beams, hammock berthing, magazines and shell rooms with stowage and trolleys, passing scuttles, plank sheer, all deck planking, armored smoke pipe and ventilator, wood backing for armor, gun supports, ceiling in hold and storerooms, military mast, mast step, awning room, hatch coamings and canopies on main deck, awning and life-line stanchions on main deck, towing bitts, warping chocks, iron rings for

ladders, hatch ladders, hammock hooks, signal and ensign staffs, boat davits and derricks, steam capstan and windlass and winch, hatch cranes, chain lockers, water tanks, deck eye-bolts, cabin pantry.

Work done during year.	Condition June 30, 1894.
Belt armor: Fitted and secured all armor	Complete.
Barbettes: Finished securing armor and fitted drains	Do.
Turrets: Both turrets built complete; armor and splinter plating fitted and secured; locking bolts, tracks, racks, and rollers secured, and fitted; aprons seven-tenths fitted. Turrets reported ready to receive turret-turning machinery, gun mounts, and guns Apr. 9, 1894.	Nine-tenths complete; waiting for ordnance material.
Conning tower: Erected; fitted complete	Complete.
Chart house: Erected and fitted complete	Do.
Officers' quarters: Fitted complete and furniture secured	Do.
Storerooms: Fitted complete and shelving secured	Seven-tenths complete.
Armory: No work	Waiting for ordnance.
Water-closets: Fitted complete	Complete.
Bathrooms: Completed captain's; fitted nine-tenths officers'	Nine-tenths complete.
Galley inclosure: Fitted complete, but galleys have since been transferred to "*Essex*."	Nine-tenths complete; waiting for new galleys.
Main-deck planking: Completed where left flying for side and barbette armor.	Complete, except final calking and planing.
Fixed ammunition rooms: Completed joiner work	Complete.
Bridge: Made and fitted	Do.
Chain stoppers: Fitted and secured	Do.
Hawse pipes: Fitted and secured	Do.
Billboards: Fitted and secured	Do.
Anchor davit and gear: Finished brace and fittings and tested with anchor.	Do.
Steering apparatus: Fitted hand steering stands and shafting	Do.
Boats: Finished all boats	Do.
Electric-light plant: Secured dynamos and molding	Completed as far as laid off.
Voice tubes: Completed and tested entire system	Complete.
Drainage and firemain: Finished all fittings	Do.
Ventilation: Finished in coal bunkers and officers quarters; altered main ducts to clear hydraulic pumps.	Do.
Painting: Painted double bottom, storerooms, berth deck, and officers quarters one coat. Cemented side armor, turrets, and superstructure, and painted two coats; painted, stained, and shellaced berth and main decks one coat.	Nine-tenths complete.
Docking: Docked twice and painted bottom once.	
Final drawings: Made one-tenth	One-tenth complete.

There is 98 per cent of the work of this department completed, based on the final completion of the vessel and outfit ready for sea.

The date of completion of the *Amphitrite* depends upon the delivery of ordnance material. The ship and outfit will be completed and ready for sea two months after it has been received.

Weights.

Department.	On board July 1, 1893.	Placed on board during year.	On board July 1, 1894.
Construction	897, 791	274, 087	1, 171, 878
Engineering	9, 994	64, 101	74, 095
Ordnance	424, 701	1, 061, 988	1, 486, 689
Equipment	9, 679	28, 850	38, 529
Totals ..... pounds	1, 342, 165	1, 429, 026	2, 771 191
Totals ..... tons	599 $\frac{405}{2240}$	637 $\frac{1418}{2240}$	1, 237 $\frac{1823}{2240}$

Draft of water July 1, 1894.

	Feet.	Inches.
Forward	10	3
Aft	12	10
Mean	11	6½

U. S. S. RALEIGH.

Items completed on or before July 1, 1893.—Keel, stem, sternpost and rudder, stern frame, transverse frames, flat keelson, longitudinals, inner bottom plating and manholes, all deck and skid beams, all deck stringers, plating on poop and forecastle decks, and on gun, berth and platform decks, under magazines and shell rooms; plating on protective deck, gutters on gun deck, all transverse bulkheads in coal bunkers, center line bulkheads beneath protective deck and central passage, ¼-inch

›rts and stairway to berth deck, gun sponsons for 3-pounders forward and 's aft, deck stanchions, engine and boiler bearers, shaft bearers, struts and ›nk sheers and waterways on poop and forecastle, planking on poop, fore- l berth deck; port shutters under forecastle and poop, metal and wooden on poop, hatch coamings and hatches in forecastle, poop, berth and plat- :s; canopies on forecastle, cofferdams complete and packed with cellulose, on lifts, passing scuttles, ash chutes, deck lights, mast partners and steps, bed, windlass and capstan, manger, bow stoppers, deck and hawse pipes, ınd towing bitts, cable bitts, warping pipes, cable nippers, ringbolts, ham- ks, conning tower, shield and tube, anchor davits and gear for bower and hors, water-closets for seamen, lavatories for officers, trimming tanks, chain ounding tubes forward and abaft engine and boiler spaces, water courses, ls, hatch ladders, chocks for fair leaders, pin rail, fittings for jacobs ladders, guards, swinging booms, ensign staffs, draft figures, search lights and stands, with military top, wooden mainmast, topmast, gaffs, blocks, cooperage, ›l plates, canopies on gun decks, coaling scuttles, gratings for engine and ›ches, coal bunker ventilation, overhead railway in coal bunkers, prison, -arms locker, hatch coamings, torpedo arrangements, watch bell, ceiling torerooms, joiner work in cabins, wardroom, junior and warrant officers' all pantries, water-closets, iron for ladders, lavatories, side gangways.

Work done during year.	Condition June 30, 1894.
›onsons: Armor received, fitted and secured in place, and all l shapes left flying secured.	Complete.
ting: Finished fitting and riveting where left flying for rmor.	Do.
Finished fitting and riveting where left flying for sponson	Do.
›office: Finished fitting and riveting structural work where ; for sponson armor; made and fitted all joiner work and mplete.	Do.
: Finished fitting and riveting structural work where left sponson armor; made and fitted all joiner work and fittings	Do.
: Fitted and secured where left flying for sponson armor, d calked all decks and shellaced covered decks.	Do.
›erthing: Fitted and secured where left flying for sponson	Do.
s, etc., for rigging: Fitted and secured where left flying for rmor.	Do.
t bridges: Fitted and secured where left flying for spon-	Do.
ts: Fitted and secured where left flying for sponson armor.	Do.
nchions: Fitted and secured where left flying for sponson	Do.
and life lines: Fitted and secured where left flying for rmor.	Do.
: Fitted and secured where left flying for sponson armor...	Do.
ted gratings, ladders, and side lights.....	Do.
: Fitted flooring, table, chart locker, nonconducting liner r, and grab rods.	Do.
Completed all bins	Do.
: Completed all fittings and tested system	Do.
Fitted additional small pipes, lagged all copper pipes in d tested system.	Do.
ring rooms: Fitted dripping pans and shelves	Do.
e: Fitted skylights, sinks, galley fixtures, and cemented	Do.
t doors: Finished all small fittings.....	Do.
s: Fitted throughout ship.....	Do.
: Completed in machinery space and tested system	Do.
hting plant: Completed all work of this department	Do.
ar: Fitted wire rope, adjusted steering engine and all hand tands.	Do.
pleted steam launch, sailing launch, two 26-foot cutters, ›ys, one whale boat, one gig, and one balsa.	Do.
s: Made and fitted	Do.
Completed and fitted in ship.....	Do.
Firing tubes and fittings of one stern tube and two broad- fitted complete; began fitting torpedo trolleys; torpedoes brackets not received.	Nine-tenths complete; waiting for ordnance material.
'ouched up all cement, painted double bottom, all store- l magazines, and outside one coat; berth deck, officers' ınd spar deck two coats; filled and varnished all hardwood. ıp twice docked and bottom painted each time.	Complete, except final coat on outside.
ngs: Seven-tenths completed.....	Seven-tenths complete.

›ced in commission April 17, 1894, since which time the usual miscellaneous tting out has been nineteen-twentieths completed; ship and outfit are now y ready for sea.

Much work of this department has been delayed, owing to the delay in the co pletion of work in the departments of Ordnance and Steam Engineering; the o side plating and the machinery space can not receive their final painting until other work has been completed.

Weights.

Department.	On board July 1, 1893.	Placed on board during year.	On boar July 1, 18
Construction	3,382,856	254,314	3,637,170
Engineering	1,350,015	402,096	1,752,111
Ordnance	13,505	299,835	283,340
Equipment	50,653	112,688	163,341
Totals, pounds	4,797,029	1,038,933	5,835,962
Totals, tons	2,141.$\frac{1128}{2240}$	463$\frac{813}{2240}$	2,605
Equipage and stores not included	.....	.....	.....

Draft of water July 1, 1894.

	Feet.	Inc
Forward	15	
Aft	18	
Mean	16	

The following tabular statement gives information as to repair work done at yard from July 1, 1893, to June 30, 1894:

Vessels upon which repair work was done during the fiscal year ending June 30, 185

Name of vessel.	Date of survey.	Date of approval of survey.	Date when work was ordered.	Date when work was begun.	Date of co tion of w
Atlanta	July 17-28, 1893.	Aug. 2, 1893	Aug. 2, 1893; June 11, 1894.	Aug. —, 1893; June 11, 1894.	Mar. 31, June 30
Bancroft	.....	.....	Mar. 7, 1894	Mar. —, 1894	Mar. 23,
Charleston	.....	.....	May 8-22, 1893; June 19-22-27, 1893.	May —, 1893; June —, 1893.	Aug. —
Concord	.....	.....	March, 1893	May —, 1893	July —
Constellation	Oct. 7-14, 1893	Dec. 6, 1893	Dec. 6, 1893	Dec. —, 1893	Apr. 28
Detroit	.....	.....	July-Aug., 1893; March-April, 1894.	July 16, 1893; Apr. —, 1894.	*Sept. —
Dolphin	.....	.....	Dec. 5, 1893; May 5, 1894.	May 5, 1894	May 19
Essex	Mar. 11-25, 1893.	Apr. 3, 1893	Apr.-May, 1893; Jan., —, 1894; June 1, 1894.	June —, 1893; June 1, 1894.	Mar. —, June 9
Fern	.....	.....	June 27, 1893	June 27, 1893	July —
Miantonomoh	.....	.....	Jan. 5, 1894	Jan. 6, 1894	Mar. 10,
Monongahela	Dec. 26, 1893; Jan. 2, 1894.	Jan. 2, 1894	Jan. 2, 1894	Jan. 2, 1894	Apr. 28,
Montgomery	.....	.....	Nov. 10, 1893	Mar. 8, 1894	June 30,
Newark	Mar. 29, 1893.	Apr. 25, 1893	Apr. 25, 1893	June 1, 1893	Sept. 16,
Nantucket	.....	.....	Sept. 1, 1893	Sept. 2, 1893	Sept. 9,
Portsmouth	.....	.....	May 25, 1893	May —, 1893	July —,
Standish	.....	.....	Oct. 9, 1893	Oct. 9, 1893	Oct. 28,
Vesuvius	.....	.....	May 3, 1894; Apr. 5, 1894.	May 4, 1894; Apr. 5, 1894.	May 5, Apr. 14
Wyandotte	.....	.....	Oct. 16, 1893	Oct. 16, 1893	Oct. 27,
Wahneta	.....	.....	Mar. 25, 1894	Apr. 19, 1894	Apr. 28,
Yard launches	.....	.....	(Miscellaneous repairs during fiscal yea		

* Three-tenths completed; probably completing Sept. 1, 1894.

Very respectfully,

FRANCIS T. BOWLES,
Naval Constructor, U. S. N

The COMMANDANT, NAVY-YARD, NORFOLK, VA.

NAVY YARD, MARE ISLAND, CAL., *July 5, 1894.*

SIR: Referring to letter No. 7500-94 of June 12, 1894, calling for a special report lescribing the construction work done upon the U. S. S. *Monadnock* from July 1, 1893, to June 30, 1894, and for a tabular statement of vessels repaired during the past year, I have the honor to submit the following report:

Drawings: A number of working drawings have been made, and work on the finished drawings has commenced.

The main-deck armor-plating has been completed.

The fore-and-aft coal-bunker bulkheads have been generally gone over, to insure water-tightness, and are now complete.

The sluice valves have been completed in the shop and have been eight-tenths itted on board. The indicators and stems have been made and are now being fitted.

Holes in bulkheads for pipes have been cut as required.

Two sounding tubes have been fitted on board and the others are about five-tenths ompleted in the shop.

All incomplete work on the chain lockers has been completed.

The superstructure deck has been laid and calked.

The main deck has been laid inside the superstructure.

The berth deck has been laid and completed.

The backing for side armor was completed, and side armor put in place and secured omplete.

The backing has been fitted complete to both barbettes, and the armor has been itted and secured to forward barbette and is now being secured to after barbette.

The conning tower has been fitted and secured in place and is nine-tenths cometed.

The armored smoke pipe has been fitted complete.

The securing of the rapid-fire gun mounts on the hammock berthing has been mpleted.

The pilot house has been completed in the shop, but has not been fitted on board.

The joiner work for cabin, wardroom, junior and warrant officers has been out eight-tenths completed in the shop, and the bulkheads for junior and warnt officers' quarters have been erected on board.

The portable furniture has been eight-tenths completed.

Storerooms: The shelving, gratings, and battens have been about five-tenths ed.

The water closet troughs and soil pipes have been fitted and the flushing pipes under way.

The metal gratings for deck lights and coal scuttles and the armored gratings for ke pipe and ventilator have been completed.

The water-tight hatch covers on berth deck have been completed, but have not a stowed.

The deck lights have been completed and fitted on board, but lenses not yet in.

Work has been commenced on the life buoys.

The portable tanks for flushing system have been six-tenths completed.

All ash gratings for berth deck have been completed.

The signal and ensign staffs have been about eight-tenths completed.

The dinghy and gig have been completed, and the steam cutter and whaleboat at six-tenths completed.

The anchor crane has been completed in shop and is being fitted on board.

Work has progressed favorably on steering apparatus; the quadrant has been pleted and fitted in place, and sheaves for chains are now being fitted.

The drainage and pumping system is now about six-tenths completed and fitted.

The ventilation system has been about four-tenths completed.

The ship has been docked and painted.

All water-tight compartments have been tested and proved tight.

Miscellaneous work, in addition to the above, has been done on all parts of ship, t the above are the principal items of work for the past year.

I estimate the percentage of work completed, based upon the final completion of e vessel and outfit ready for sea, at 78 per cent, and she should be ready for trial y February, 1895.

The photographs called for are forwarded under separate cover.

Appended to this report is a tabular statement of vessels repaired during the year, made up as requested.

Very respectfully,

S. W. ARMISTEAD,
Naval Constructor, U. S. Navy.

The COMMANDANT, NAVY-YARD, MARE ISLAND, CAL.

Statement of vessels on which repair work was done at navy-yard, Mare Island, Cal., during the year ending June 30, 1894.

Name of vessel.	Date of survey.	Date of approval of survey.	Date when work was ordered.	Date when work was begun.	Date of completion.
Hartford	Aug. 11, 1893	Sept. 15, 1893	Sept. 15, 1893	Not commenced.	
Ranger	Oct. 5, 1893	Oct. 16, 1893	Oct. 7, 1893	Oct. 9, 1893	May 17, 1894.
Launch No. 147	Oct. 12, 1893	Oct. 21, 1893	Oct. 21, 1893	Oct. 27, 1893	Nov. 18, 1893.
Alert	Oct. 19, 1893	Nov. 15, 1893	Nov. 15, 1893	Dec. 26, 1893	Apr. 20, 1894.
Boston	Oct. 20, 1893	Dec. 2, 1893	Dec. 2, 1893	June 14, 1894	Not completed.*
Mohican	Oct. 23, 1893	Nov. 2, 1893	Oct. 24, 1893	Oct. 25, 1893	Dec. 22, 1893.
Yorktown			Mar. 7, 1894	Mar. 7, 1894	Mar. 21, 1894.
Bennington			May 2, 1894	Apr. 30, 1894	May 7, 1894.
Thetis	May 26, 1894	June 6, 1894	June 1, 1894	June 5, 1894	Not completed.†
Marion	June 7, 1894	June 23, 1894	June 23, 1894	June 25, 1894	Not completed.‡
Monterey	Arrived at yard Aug. 15, 1893; May 12, 1894.		Aug. 19, 1893; May 10, 1894.	Aug. 19, 1893; May 10, 1894.	Apr. 8, 1894; June 30, 1894.

* Commenced; estimated date of completion, January, 1895.
† Progress of work, five-tenths; estimated date of completion, Aug. 15, 1894.
‡ Commenced; estimated date of completion, Sept. 1, 1894.

OFFICE OF SUPERINTENDING CONSTRUCTOR,
WM. CRAMP & SONS' SHIP AND ENGINE BUILDING WORKS,
Philadelphia, July 2, 1894.

SIR: 1. In compliance with the instructions contained in the letter of the Bureau of Construction and Repair, No. 7502-94, dated June 12, 1894, I have the honor to submit herewith a special report showing the work done upon each ship under my superintendence from July 1, 1893, to June 30, 1894.

2. Photographic views of each vessel being constructed under my superintendence, with dates when taken, will be forwarded as directed.

Very respectfully,

J. F. HANSCOM, U. S. Navy,
Superintending Constructor.

CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

U. S. S. INDIANA.

This vessel was launched February 28, 1893, and is now being completed alongside the dock. She had a successful contractors' trial March 6-9, 1894, the side armor recesses being planked over, temporarily, and calked for this trial. It is estimated that 87 per cent of the hull work under the contract, based on the vessel fitted out ready for sea, has been completed, and that she will be ready for final delivery to the Government seven months after the delivery of the last armor plate.

Progress during the year:

Inner bottom manhole covers have been fitted. The fitting of water-tight doors is completed, with the exception of a few fittings.

The center-line bulkhead has been riveted.

The main and superstructure deck planking has been laid.

The air ports and deck lights have been fitted. Coaling scuttles and chutes have been completed.

The foundations for steering arrangements have been built, and steering gear and engine have been completed.

Anchor davits and tripping gear, for bower anchors, and boat cranes have been completed.

Deck pipes have been fitted. The winches have been fitted and steam connections made. The capstans have been placed. The ice machine has been installed.

The ship's ventilation system has been advanced from 50 per cent to 90 per cent of completion. The coal-bunker ventilation, which was 20 per cent completed July 1, 1893, and forced draft in fire rooms, then 70 per cent completed, have been fully completed. The pumps have been fitted, and the drainage and pumping system have been advanced from 70 per cent to completion, except the operation of secondary valves.

The mooring staples have been riveted in place. The bow and stern torpedo ports and tubes are completed, and fitting of broadside ports just begun. The scuppers are completed, except in wake of casemate armor.

The dispensary and engineers' storeroom are completed. Engineers' log room and paymaster's office are 60 per cent completed. The joiner work in storerooms is 80 per cent completed. The joiner work in pantries and officers' rooms and offices is 60 per cent completed.

The fittings in the officers' water-closets are 90 per cent, and in the following rooms are fully completed: In crew's lavatory, in firemen's wash rooms, and in water-closets and urinals for crew.

The platforms for 6-inch guns and the backing behind all armor is completed.

The after-diagonal casemate armor has been secured.

The barbette armor for 13-inch and 8-inch barbettes has been received, fitted, and secured. The conning-tower tube has been fitted. The spenson plates for 6-inch guns and for 6-pounder guns on main deck are completed, except shutters. The armor plates for 1-pounder guns, at the ends of the vessel, and shutters are completed. The armored tubes for 8-inch ammunition hoists are fitted. The casemate armor above the belt has been received and 4 plates have been fitted.

The testing of water-tight compartments has been completed. The painting necessary for preservation has been done.

U. S. S. MASSACHUSETTS.

This ship was launched June 10, 1893, and is now completing alongside the dock. It is estimated that 84 per cent of the hull work under the contract is completed to date, based on the vessel fitted out ready for sea. The date of the contractors' trial will depend upon the delivery of the armor, and it is estimated that seven months after the delivery of the last armor plate the U. S. S. *Massachusetts* will be ready for the final delivery to the Government.

Progress during the year has been as follows:

Inner bottom manhole covers have been completed. The water-tight doors have been completed, except a few fittings.

Bridge deck beams have been erected. The middle line bulkhead and hammock berthing have been riveted.

Deck planking and plank sheers have been commenced and advanced to 50 per cent completion. Air ports and deck lights have been completed.

The ash chutes are completed, and coaling chutes and coaling scuttles are 80 per cent completed.

The following items are completed: Fitting of deck pipes, anchor davits, and steel wire cable nippers, and the installation of the windlass, steam winches, capstans, steering gear and engine, and the building of foundations for steering arrangements.

The crew's urinals and water-closets are 90 per cent completed.

The mast has been riveted together in the yard.

The joiner work in the storerooms is 40 per cent, in dispensary 80 per cent, and in officers' quarters 20 per cent completed.

Drainage and pumping are 90 per cent completed, coal-bunker ventilation has been advanced from 20 per cent, and forced draft for fire rooms from 60 per cent to completion. The ship's ventilation is 90 per cent completed.

The armor backing is about completed. The diagonal casemate armor has been fitted, also conning-tower tube.

The ship has been kept painted as far as necessary for protection.

U. S. S. IOWA.

The building of this ship was authorized July 19, 1892, and the contract with the Messrs. William Cramp & Sons was signed February 11, 1893.

On July 1, 1893, nothing had been done, except the work on the mold-loft floor, which was then nearly completed. The first keel plate was laid August 5, 1893.

It is estimated that 19 per cent of the hull work under the contract, based on the vessel fitted out ready for sea, has been completed to June 30, 1894. The date of the contractors' trial will depend upon the date of the delivery of the armor. It is estimated that the *Iowa* will be ready for final delivery to the Government seven months after the delivery of the last armor plate.

The completion to June 30, 1894, has been as follows:

The flat keel, vertical keel, and flat keelson have been completed as far as possible until after the erection of the stem, which has been received, and is now being drilled and chipped preparatory to erection. The sternpost has been erected.

The erection of the transverse framing to armor shelf is completed, except at the ends. The framing behind the belt armor is 80 per cent completed.

The outside plating, up to the armor shelf is completed within the limits of double bottom. The inner bottom is completed, except getting out a few plates, and about one-half of the riveting.

The longitudinals are completed within the limits of the double bottom.

The deck beams of platform deck are 80 per cent and berth deck 60 per cent completed.

Platform deck plating is 60 per cent, and berth deck plating 20 per cent completed.

The outer wing bulkhead is nearly completed; the stiffeners and staples for inner wing bulkhead are under way. The boundary angles have been gotten out for many of the transverse bulkheads below the protective deck.

The boiler bearers are 10 per cent completed. The boundary angles of docking keels are riveted up.

U. S. S. BROOKLYN.

The building of this vessel was authorized July 19, 1892, and the contract with the builders signed February 11, 1893.

On July 1, 1893, the lines were faired on the mold loft floor. It is estimated that 20 per cent of the hull work under the contract based on the vessel fitted out ready for sea, is now completed; that she will be ready for the contractor's trial about February 1, 1896, and for final delivery to the Government July 1, 1896.

The work during the year has been as follows: Work on the mold loft floor has been completed. The first keel plate was laid August 2, 1893, and the first frame was erected October 13, 1893. The vertical keel, flat keel, and flat keelson are completed, except a few plates at the ends. The stem has been received, and the lower piece erected.

The tranverse framing to the margin plate, and the transverse framing from the margin plate to the protective deck, are 90 per cent completed. The transverse framing above the protective deck is 30 per cent completed.

The longitudinals are completed within the limits of the double bottom.

The outside plating is 50 per cent completed. The inner bottom plating is completed, except a few plates at ends, and riveting.

The beams of protective deck are 80 per cent, of platform deck 50 per cent, and of berth deck 20 per cent completed. The protective deck plating is 60 per cent, and platform deck plating is 40 per cent completed.

Of the bulkheads below the protective deck the outer wing is nearly completed, the inner wing is commenced, and the transverse bulkheads are 50 per cent completed.

U. S. S. MINNEAPOLIS.

On July 1, 1893, this ship was on the stocks, but launching ways were commenced. The ways were completed and the vessel launched August 12, 1893. She made a very successful contractors' trial June 5–7, 1894, and will go on the Government trial July 10, 1894. It is estimated that 93 per cent of the hull work under the contract based on the vessel fitted out ready for sea has been completed to date, and that she will be ready for final delivery to the Government about October 15, 1894.

Progress during the year has been as follows:

The conning tower, shield and tube have been put in place, and the conning tower is now completed, except floor and entrance gratings. Glacis plates for engine hatches have been received and fitted, also armor plates for the 4-inch guns and secondary battery.

The following riveting has been finished: Of cofferdams, boiler bearers, transverse bulkheads in boiler spaces, hammock berthing, hatch coamings and skylights, anchor beds, and ducts for forced draft in fire rooms.

Manhole covers to inner bottoms, and trimming tanks have been completed, water-tight doors and fittings have been advanced from five-tenths completion to completion, except a few fittings. The testing of water-tight compartments has been commenced and completed.

The masts have been built and stepped, and search-light platforms have been completed, except rails.

The windlass and capstans were six-tenths fitted July 1, 1893, and are now completed. One of the steam winches has been received and installed. The steering gear and engine have been completed, bitts and wire cable nippers have been received and fitted. The anchor crane has been built and stepped. Four pairs of boat davits have been completed. Life buoys have been received and fitted.

Ash chutes and coaling chutes have been built.

Drainage and pumping has been advanced from four-tenths to nine-tenths of completion. Ventilation, which was two-tenths completed July 1, 1893, is now fully completed, except a few connections.

The fittings of the following rooms have been completed: Of prisons, firemen's wash rooms, chain lockers, and of water and trimming tanks; also fittings for anchor beds. The fitting of air ports has been completed.

The fitting of scuppers has been advanced from three-tenths to nine-tenths completion. The crew's wash room is completed except fittings. The refrigerator room has been advanced from two-tenths to completion, except fittings.

Wire screen bulkheads have been built around the galley and ice machine. The chain lockers and engineers' workshop have been completed.

The joiner work in officers' water-closets, lavatories, offices, pantries, mess rooms, and in the armory has been commenced and is now seven-tenths completed.

The stowage of portable furniture aboard ship has been commenced. The boats are built and ready to be placed on board.

The ship has been painted in so far as necessary for protection.

U. S. S. NEW YORK.

This vessel was commissioned August 1, 1893.

On July 1, 1893, the work was reported 98 per cent finished; she was completed and passed out of the hands of the Construction Department, September 19, 1893.

The principal items of work are as follows:

Armor plates for 8-inch turrets were placed and secured, and tops of turrets, turret aprons and interior fittings completed.

Torpedo fittings to hull completed and tested.

Fittings were completed in ammunition rooms, including nonconducting covering. Also fittings in torpedo manipulating rooms, ordnance and engineer's workshop fixed ammunition rooms, chart house, etc.

Boat cranes were tested.

Boats were completed and stowed on board.

All articles of portable furniture and outfit, cooperage, chests, blocks, etc., were completed and stowed on board.

All minor fittings were completed, such as rubbing plates, pin rails, fair leaders, chocks, bolts, wood and iron ladders, side ladders, gratings, shot and rifle racks, chronometer and compass lockers, signal lockers, etc.

The final cleaning and painting of ironwork inboard and outboard, mending cement work, painting woodwork, cleaning and polishing hardwood work, planing decks, fitting wire mats, gilding head and stern ornaments, etc., were completed.

U. S. S. COLUMBIA.

This vessel was launched July 26, 1892, had her official trial November 18, 1893, and was commissioned April 23, 1894. The forty-eight-hour sea trial was held May 17–20, 1894.

Progress during the year has been as follows:

Armor plates for sponsons and secondary battery have been received and fitted.

Ammunition hoists have been built and installed.

Gun supports, conning tower and foundation, hatch coamings, sky-light and inclosures have been advanced from 70 per cent and 80 per cent to completion.

Cofferdams at ends of ship have been packed with cellulose and closed.

The magazines, shell and ammunition rooms, torpedo manipulating rooms, about 90 per cent completed last year have been finished.

Torpedo ports and hull fittings, which were just commenced, have been completed.

The coaling scuttles, fixed and portable, coaling chutes, ash chutes, portable coaling tracks, etc., have been advanced from various stages to completion.

The drainage and pumping system, ventilation system and arrangements for forced draft, trimming tanks and water tanks have been completed from a condition about about 90 per cent finished last year.

Joiner work on chart house, captain's ward room, junior and warrant officers' quarters, also joiner work in storerooms, hold, pantries, lavatories, etc., which were in various degrees of completion from 60 per cent to 90 per cent have all been finished.

The steering arrangements have been advanced from 80 per cent to completion.

Fittings on anchor beds have been completed, also sheet, stream and kedge anchors have been stowed.

The following items have been commenced and completed during the year: boat davits, cradles and tracks, dispensary, guard rails, lines and stanchions, awning stanchions, canopies, stern gallery, swinging and cargo booms, head ornaments.

The boats and their outfits have been finished and placed on board.

All iron and wood ladders, accommodation ladders, wood and iron gratings, etc., have been completed.

All miscellaneous work, such as placing bolts and cleats, numbering compartments, making valves, working hand rails and grab rods, pin rails, adjusting water-tight doors and scuttles, painting pipes the distinguishing colors, completing hammock berthing and berthing arrangements, side pipes, torpedo scuttles, gallery fittings, has been completed.

All articles of portable furniture and miscellaneous outfit have been manufactured and stowed or fitted on board.

All cement work, paint work, both iron and wood, inside and out, polished woodwork and bright woodwork has been gone over and completed, the ship cleaned and put in thorough condition for commissioning.

OFFICE OF NAVAL CONSTRUCTOR,
UNION IRON WORKS,
San Francisco, Cal., July 5, 1894.

SIR: In accordance with the Bureau's instructions of the 12th ultimo, I have the honor to make the following statement, showing the work done on the hull of coast line battle ship No. 3 (*Oregon*), from July 1, 1893, to June 30, 1894:

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Flat keel	Completed	Completed.
Vertical keel	do	Do.
Stem	do	Do.
Stern post	do	Do.
Stern frame	do	Do.
Rudder	do	Do.
Transverse frames	Completed to main deck	Do.
Outside plating	Completed below armor shelf; above armor shelf plates in place abreast citadel; forward and abaft citadel plates being fitted in place.	Completed, except 8 plates to be removed in fitting belt armor.
Flat keelson plates	Completed	Completed.
Inner bottom	do	Do.
Longitudinals	do	Do.
Transverse bulkheads	Completed below berth deck; about 50 per cent in place on berth deck; material for others being fitted.	Do.
Longitudinal bulkheads	Completed below berth deck in citadel and below protective deck in ends; above protective deck in ends nearly all in place, but not completely riveted; on berth deck bulkheads almost all in place and now being riveted.	Completed below berth deck; on berth deck all erected and 60 per cent riveted.
Ammunition passages	Completed	Completed.
Water-tight doors	All door frames completed below berth deck, except store rooms, doors aft in place; balance completed in shops.	90 per cent completed.
Main deck beams	All in place	Completed
Berth deck beams	do	Do.
Protective deck beams	Completed	Do.
Platform deck beams	do	Do.
Splinter deck beams	do	Do.
Superstructure deck beams.	Eight on board, ready for fitting in place.	Do.
Shaft struts	Completed	Do.
Bridge beams	Nothing done	Do.
Skid beams for boats	do	Do.
Deck plating	Platforms completed; protective deck completed; berth deck within citadel, lower course completed, upper courses nearly all in place and riveted; berth deck forward nearly completed, aft only a few plates in place; splinter deck completed; main deck all in place, except a few plates in wake of 13-inch guns; on berth and main decks plates in wake of boilers not yet riveted.	Do.
Plank sheers or waterways.	Nothing done	95 per cent completed.
Deck planking or covering.	do	Deck plank on main, and superstructure decks and on bridge laid, but not yet calked.
Deck coating	do	Nothing done.
Gratings and hatch covers	do	Iron gratings in auxiliary boiler room and engine hatches completed.
Armored gratings in protective deck.	Grating bars and rests ready for fitting in engine, boiler, and ventilation hatches.	Engine hatch 80 per cent completed; boiler hatches completed, ventilation hatches 50 per cent completed.
Gutters on decks	Outer angle in place forward and abaft of superstructure; inner angle forward and abaft of superstructure in place, but not riveted.	Completed.
Supply of ammunition	Nothing done	Tracks for 13-inch ammunition completed.

Item.	Condition July 1, 1893.	Condition June 30, 1893.
Magazines	Light boxes all made and fitted, but not in place.	Light boxes completed, and ammunition saddles 75 per cent completed in shop.
Shell rooms	Nothing done	Light boxes completed.
Fixed-ammunition rooms	do	Do.
Ready-service magazines	do	Do.
Torpedo-manipulating rooms.	do	Nothing done.
Passing scuttles	Those of auxiliary magazines fitted in place on berth deck.	Completed.
Torpedo fittings to hull	Nothing done	Bow and stern tubes, shutters and gear completed; broadside shutters and gear 75 per cent completed.
Hatch coamings, sky lights, and inclosures.	do	Coamings completed, skylights 80 per cent completed, inclosures completed
Cofferdams	All erected forward, but riveting not completed; aft in place from frame No. 74	Completed and tested.
Steering arrangements	Hydraulic gear in place; hand gear completed in shops.	All completed, except connections with conning tower and pilot house.
Boat cranes	Angles and plates are bent and being punched; engines completed in shops.	Completed.
Chart house	Nothing done	60 per cent completed.
Bulkheads and fittings in officers quarters.	do	Metal work 90 per cent completed; joiner work 50 per cent completed in shops.
Chain lockers	Completed	Completed.
Water tanks	Completed forward; aft, angles in place, plates punched, but not yet in place.	Do.
Trimming tanks	Completed	Do.
Prisons, etc	Nothing done	Bulkheads completed.
Firemen's wash rooms	do	Do.
Crew's water-closets	Bulkheads in place	85 per cent completed.
Crew's lavatory	Nothing done	Shower-bath bulkeads completed.
Air ports	Completed in shops	90 per cent completed in ship.
Deck lights	Completed in shops	Completed in shops.
Wood floor in coal bunkers.	Angles in place	Completed.
Water courses, etc	Cut in double bottom	Do.
Ceiling in hold, storerooms, etc.	Nothing done	Ceiling on berth deck just begun.
Sail and awning room	do	Nothing done.
Engineers' workshop	do	Do.
Ordnance workshop	do	Do.
Engineers' log room	do	Do.
Engineers' storerooms	do	Completed.
Hammock berthing	do	Completed except wood molding and lining.
Coaling scuttles	do	Completed.
Coal chutes	do	Fixed chutes 95 per cent, one portable chute completed.
Ash chutes	do	60 per cent completed.
Engine, boiler, and shaft bearers.	Completed	Completed.
Refrigerating room and ice-machine room.	Nothing done	50 per cent completed
Scuppers	do	Completed in shops; 95 per cent fitted.
Military mast and tops	do	Completed.
Lamp room	do	Bulkheads in place
Oil tanks	do	Nothing done.
Steam winches	Completed in shops	Completed.
Windlass	On board being placed in position	Do.
Capstan	Nothing done	Do.
Deck pipes	do	Do.
Hawse pipes	do	Do.
Stern pipes	do	Do.
Drainage and pumping	Completed in double bottom, except strainers and elbow connections for different compartments; main pipes and valves completed above double bottom in fire rooms.	Completed in double bottom; and 70 per cent completed above double bottom.
Pumps	95 per cent completed in shops	Completed.
Feed tanks	Nothing done	Do.
Ventilation	Casings for forward blowers in place, not riveted; fans completed in shops; engines well advanced.	Casings and fans completed, pipes and valves, 85 per cent completed, cowl ventilation, 90 per cent completed.
Ventilation of coal bunkers.	Nothing done	80 per cent completed.
Forced draft in fire rooms.	Blower casings erected, but not riveted.	Casings completed.
Fresh and salt water service.	Nothing done	80 per cent completed.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Framing behind belt armor.	Completed	Completed.
Framing behind diagonal armor.	do	Do.
Armor plating	14-inch diagonal armor nearly completed; diagonal casemate armor being fitted.	All completed except belt armor, 13-inch B. L. R. barbette armor, and 13-inch and 8-inch B. L. R. turret armor.
Backing behind armor	Completed for belt armor; completed for diagonal armor forward and aft.	Completed except for turrets and for 13-inch B. L. R barbettes.
13-inch B. L. R. turrets	Beds for roller paths completed	Barbettes completed except wood backing and armor; turret shells, 50 per cent completed in shops; live rings and two bottom roller paths completed in shops.
8-inch B. L. R. turrets	Nothing done	Barbettes completed; turret shells completed; live rings, 90 per cent completed; roller paths, 75 per cent completed: turning tubes, 80 per cent completed in shops; armored ammunition tubes completed.
Conning tower, shield, tube, and foundation.	Tube being fitted	Completed.
Torpedo net booms	Nothing done	Nothing done.
Galley	do	Metal work of inclosure and coal bins completed.
General and other store rooms.	do	Nothing done.
Officers lavatories	do	Do.
Officers' water-closets	do	Do.
Captain's office	do	Do.
Executive officer's office	do	Do.
Navigator's office	do	Do.
Paymaster's office	do	Do.
Surgeon's examining room	do	Do.
Dispensary	do	Do.
Pantries	do	Bulkheads erected.
Armory	do	Nothing done.
Canopies to hatches	do	75 per cent completed.
Ladders to hatchways, etc.	do	Nothing done.
Iron rounds or ladders	All in place on bulkheads forward below berth deck.	90 per cent completed.
Brass rubbing plates, etc.	Nothing done	Nothing done.
Label plates	do	Do.
Jacob's ladder	do	Do.
Running lights	do	Do.
Life buoy	do	Completed.
Swinging booms	do	Nothing done.
Swinging tables and benches for crew.	do	Do.
Reels	do	Do.
Hatch cranes	do	Completed.
Chronometer and compass locker.	do	Nothing done
Master at-arms' enclosure.	do	Do.
Signal lockers	do	Do.
Lumber irons	do	Do.
Ladders (side), sea steps, etc.	do	Do.
Gangway boards	do	Do.
Guard rails and stanchions.	do	Completed on main deck; superstructure and bridges 50 per cent completed.
Shot racks and rifle racks.	do	Nothing done.
Attachment for rigging, plates, bolts, etc.	do	Do.
Bow chocks	do	Completed.
Warping or towing bitts	do	Do.
Warping chocks	do	Do.
Anchor davits	Completed	Do.
Anchor beds	Completed, except slight riveting	Do.
Cable bitts	Nothing done	Do.
Bow stoppers	do	Completed in shop.
Boat davits and cradles	do	Davits completed.
Shaft tubes	Completed	Completed.
Shaft struts	do	Do.
Platform for guns	Nothing done	Completed for 6-inch B. L. R.
Lashing bolts and shackles for securing guns.	do	Nothing done.
Chocks for fair leaders	do	Do.
Hammock hooks	do	Do.
Watch bell	Completed in shops	Completed in shops.
Awning stanchions	Nothing done	Completed on main deck.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Eyebolts in beams	Nothing done	50 per cent completed.
Mooring staples	do	Completed.
Cleaning and painting steel and ironwork.	80 per cent of all completed work has been cleaned and painted.	Completed work being kept painted.
Ensign and signal staffs	Nothing done	Completed.
Head and stern ornaments	do	Do.
Manhole scuttles	Completed and in place in inner bottom.	Do.
Sounding tubes	Nothing done	Do.
Mess and clothes lockers for crew.	do	Nothing done.
Painting, graining, and polishing.	Nothing done except first coat on metal work.	Completed work being kept painted.
Dynamo room and electrical storeroom.	Nothing done	Dynamo foundations completed; storeroom bulkheads erected.
Voice pipes or telephones, call bells, etc.	do	Nothing done.
Testing water-tight compartments, tanks, etc.	Water-tight compartments tested from forward to frame No. 35.	Completed.
Ring bolts in deck	Nothing done	A few completed forward.
Portable furniture	do	Just begun in shops.
Cooperage	do	About two-thirds completed.
Miscellaneous outfit	do	Nothing done.
Boats	do	Steam cutters, 95 per cent completed; other boats begun.
Upholstering	do	Nothing done.
Casings to pipes, valve rods, etc.	do	Do.
Sentries' walks and stools for leadsmen.	do	Do.
Stowage for spare coal bags.	do	Do.
Flash plates	do	Do.
Cement or other coatings in double bottom and elsewhere.	Double bottom has been given a coat of red lead.	75 per cent completed.

In my opinion, this vessel is 80 per cent completed, on the basis that 100 per cent completion represents her condition when ready for sea in all matters coming under the cognizance of the Bureau of Construction and Repair.

If all the armor is delivered by February 1, 1895, this vessel will, in my opinion, be ready for her contractors' trial about April 1, 1895, and for delivery to the Government about June 1, 1895.

Very respectfully,

A. W. STAHL,
Naval Constructor, U. S. Navy, Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

OFFICE OF NAVAL CONSTRUCTOR,
UNION IRON WORKS,
San Francisco, Cal., July 5, 1894.

SIR: In accordance with the Bureau's instructions of the 12th ultimo, I have the honor to make the following statement showing the work done on the hull of Cruiser No. 6 (*Olympia*) from July 1, 1893, to June 30, 1894.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Flat keel	Completed	Completed.
Vertical keel	do	Do.
Stem	do	Do.
Stern post	do	Do.
Stern frame	do	Do.
Rudder	do	Do.
Transverse frames	do	Do.
Flat keelson plates	do	Do.
Longitudinals	do	Do.
Outside plating	Completed below main deck; above main deck a few plates in place, and about three-fourths of plates laid off and ready to be fitted.	Do.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Inner bottom	Completed	Completed.
Deck beams	do	Do.
Bridge beams	do	Do.
Skid beams for boats	do	Do.
Deck plating	do	Do.
Transverse and longitudinal bulkheads.	do	Do.
Gutters on decks	do	Do.
Deck stanchions	do	Do.
Engine, boiler, and shaft bearers.	do	Do.
Shaft tubes and struts	do	Do.
Water-tight doors	do	Do.
8-inch B. L. R. turrets	Nothing done	Completed except fitting turret armor and water shed.
Radial girders under turrets	Vertical brackets and ring under deck made, but not in place.	Completed.
Armored tubes to turrets	Holes enlarged for new size of tubes, angles being fitted.	Do.
Turning tubes to turrets	Nothing done	Do.
Vertical armor to 5-inch guns	6 sponsons being fitted	Do.
Vertical armor to 6-pounder guns.	Almost completed	Do.
Conning tower	Tube and foundation completed; conning tower and shield, nothing done.	Do.
Hatch coamings and skylights.	Coamings completed; skylights 50 per cent completed.	Do.
Cofferdams	Completed, except filling with cellulose.	Completed, except filling with cellulose.
Bilge keels	Completed	Completed.
Ammunition lifts	Completed, except lining	Details of tops and bottoms to be altered, and hoisting mechanism to be installed.
Magazines and shell rooms	Completed	Padlocks to be fitted to hatch covers, to flood cocks and to light boxes.
Torpedo manipulating rooms	Decks laid in bow and stern rooms	Completed.
Torpedo stowage	Nothing done	Nothing done.
Torpedo tracks	do	Do.
Torpedo port fittings	All castings made and fitted in shops; bow and stern tubes fitted in place; stern shutter completed.	Completed.
Passing scuttles	Completed in shops; one fitted in place.	Completed, except eyebolt and chain over after scuttle
Entrance ports	Doors completed in shops	Completed.
Hammock berthing	Completed, except wood molding and lining.	Do
Coal scuttles	Completed	Do.
Coaling chutes	do	Do.
Coal-chute plugs	do	Do.
Ash chutes	do	Do.
Chain lockers	do	Do.
Scuppers	do	Do.
Pumping and drainage	Almost completed	Do.
Plank sheers and waterways	Nearly completed on superstructure deck.	Do.
Deck plank	Completed on superstructure and berth decks; main deck within superstructure completed except margin planks and gun platforms.	Final calking, paying, and planing to be completed, to be shellaced in officers' quarters and elsewhere, as directed; linoleum to be fitted in dynamo room; gratings to be fitted in torpedo head rooms.
Water tanks	Completed	Locks to be fitted.
Trimming tanks	do	Completed.
Freeing ports	Holes cut; shutters not yet fitted.	Do.
Refrigerating room	Cement laid, wood lining almost completed.	Do.
Prisons	Nothing done	Completed, except locks
Firemen's wash room	Metal bulkheads completed; rings for basins in place.	Completed, except clothes hooks
Crew's lavatory	Inclosure completed; doors hung.	Do.
Crew's water-closets	Inclosure completed; pipes for flushing fitted.	Do.
Steering arrangements	Completed, except in conning tower and chart house.	Completed.
Chart house	Work well advanced in shops	Do.
Air ports	Castings completed and fitted in place except in superstructure.	A few broken and imperfect lights to be replaced.
Deck lights	Completed in shops	Completed.
Ventilation	Almost completed; Sturtevant fans in place.	Do.
Forced draft	Completed	Do.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Masts	Completed	Completed.
Military and search-light tops	Completed, except riveting upper inner angles.	Do.
Wood floor in coal bunkers	Completed	Do.
Water courses	do	Do.
Ceiling in hold, storerooms, etc.	do	Do.
Sail and awning room	Metal bulkheads completed; battens fitted; wooden doors and shelves to be made.	Do.
Ordnance workshop	Nothing done	Completed, but to be shifted in location.
Engineers' workshop	Completed, except wire bulkhead.	Completed.
Engineers' log room	Nothing done	Do.
Engineers' storerooms	Completed	Do.
Carpenter's workshop	Nothing done	Do.
Lamp room	do	Do.
Oil tanks	Completed	Do.
Windlass	do	Do.
Capstan	Nothing done	Completed; bars to be placed on board.
Deck pipes	Completed	Completed.
Hawse pipes	do	Do.
Stern pipes	do	Do.
Cable bitts	do	Do.
Bow stoppers	do	Do.
Ring bolts in deck	Completed in shops	Do.
Warping or towing bitts	Completed	Do.
Warping chocks	do	Do.
Bow chocks	do	Do.
Wire-cable nippers	Completed, except securing in place.	Do.
Anchor davits	Completed	Do.
Billboards	do	Do.
Boat davits	Being fitted	Do.
Boat cradles	Completed in shops	To be fitted to boats and padded
Wardroom, junior and warrant officers' quarters.	Joiner work well advanced in shops.	Completed.
Cabins, state and other rooms on main deck.	Joiner work about one-fourth completed in shops.	Do.
Officers' lavatories	Laid off	Do.
Officers' water-closets	Stanchions for bulkheads secured.	Do.
Admiral's office	Laid off	Do.
Captain's office	do	Do.
Executive officer's office	do	Do.
Navigator's office	do	Do.
Paymaster's office	Nothing done	Do.
Sick bay	Lining being fitted; work almost completed in shops.	Do.
Dispensary	Laid off	Do.
Pantries	do	Do.
Armories	Work on bulkheads begun in shops.	Do.
Galley	Inclosure completed; galley fittings not yet located; wire panels to be fitted.	Completed; galley outfit set up.
Band room	Bulkheads begun in shop	Completed.
General and other storerooms	Almost completed	Do.
Manhole scuttles	Completed	Do.
Sounding tubes	Almost completed	Do.
Armor gratings and covers to openings in protective deck.	Completed	Do.
Gratings and hatch covers	All made and fitted except for main deck.	Do.
Hatch canopies	Work well advanced in shops	Completed; to be placed on board.
Ladders to hatchways, etc	Well advanced; no vertical ladders yet made.	Do.
Iron rounds or ladders	Almost completed	Completed.
Lumber irons	Nothing done	Do.
Ladders, side	Iron work completed in shops	Do.
Sea steps	Completed	Do.
Leadsmen's stools	Nothing done	Do.
Guard rails and stanchions	Completed	Do.
Portable furniture	Work well advanced	Completed; to be placed on board.
Blocks	Nothing done	Do.
Cooperage	Deck buckets made; other work under way.	Completed.
Mess lockers for crew	Nothing done	Completed, except two to be built in forward broadside torpedo room.
Jack rods for men's bags	Nothing done	Completed, except a few rods still to be fitted.
Clothes lockers for petty officers.	24 to be built	Completed.
Swinging tables and benches for crew.	Well advanced in shops	Completed; to be placed on board.

Item.	Condition July 1, 1893.	Condition June 30, 1894.
Hose reels	Nothing done	Completed.
Hawser reels	do	Do.
Hatch cranes	do	Do.
Chronometer and compass locker.	do	Do.
Master-at-arm's locker	do	Do.
Signal lockers	do	Do.
Hammock hooks	Completed in shops	Do.
Watch bell	do	Do.
Awning stanchions	Almost completed	Completed, except jack rods on turret armor.
Eyebolts in beams	do	Completed.
Mooring staples	Completed	Do.
Electric plant	Dynamos and engines on board; other work begun.	Do.
Attachments for rigging	Completed in shops	Do.
Gun platforms	Completed on berth deck and on hammock rail.	Do.
Lashing bolts and shackles for securing guns.	Nothing done	Do.
Chocks and fair leaders	Completed	Do.
Pin rails	Nothing done	Do.
Brass rubbing plates	do	Do.
Brass label plates	Completed	Do.
Jacob's ladders	Nothing done	Do.
Running lights	do	Do.
Life buoys	Almost completed; detaching gear being fitted.	Do.
Swinging booms	Ironwork completed	Do.
Boats	Nothing done	Completed, except trying boats afloat and placing them on board.
Chests and benches	Nothing done	Completed; to be placed on board.
Miscellaneous outfit	do	Do.
Ensign staffs	Completed in shops	Completed.
Head and stern ornaments	Nothing done	Do.
Cement	Almost completed	Do.
Cleaning and painting	All metal work being kept painted.	Ship to be cleaned and have final coat of paint throughout.

In my opinion, this vessel is 99 per cent completed, on the basis that 100 per cent completion represents her condition when ready for sea in all matters coming under the cognizance of the Bureau of Construction and Repair.

The vessel has had her contractors' trial, and has been preliminarily accepted; and if the turret armor is delivered here by September 1, 1894, the vessel will be ready for delivery to the Government by November 1, 1894.

Very respectfully,

A. W. STAHL,
Naval Constructor, U. S. Navy, Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

OFFICE OF SUPERINTENDING CONSTRUCTOR,
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY,
Newport News, Va., July 9, 1894.

SIR: (1) In obedience to the Bureau's letter, No. 7502-94, of the 12th ultimo, I have the honor to submit the following special report of work executed in connection with the construction of light-draft protected gunboat No. 7 to July 1, 1894:

The lines of the vessel have been laid down in the mold-loft floor and faired.

Frame and other molds completed.

The keel blocks have been laid and the building slip prepared for beginning work.

Three hundred and thirty-five thousand four hundred and sixty-five pounds of steel plates and 89,143 pounds of steel shapes have been received in the yard.

About 25 per cent of the Z-frames have been furnished and bent to shape and partially fitted.

Flange gussets for frames in wake of inner bottom half completed.

I estimate the percentage of work completed, based on the vessel fitted out ready for sea, to be 2 per cent.

(2) While the condition of the work is such as to render it impossible to state with any certainty the dates when the vessel will be ready for the contractors' trial

and for final delivery to the Government, yet I am of the opinion that there should be no difficulty in completing the vessel ready for final delivery within the contract time, namely, January 22, 1896.

Very respectfully,

J. J. WOODWARD,
Naval Constructor, U. S. Navy, Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

OFFICE OF SUPERINTENDING CONSTRUCTOR,
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY,
Newport News, Va., July 9, 1894.

SIR: (1) In obedience to the Bureau's letter, No. 7502-94, of the 12th ultimo., I have the honor to submit the following special report of the work executed in connection with the construction of light-draft protected gunboat No. 8 to July 1, 1894:

The lines of the vessel have been laid down in the mold-loft floor and faired.

Frame and other molds completed.

The keel blocks have been laid and the building slip prepared for beginning work.

Seventy-five thousand two hundred and ninety-six pounds of steel plates and 62,998 pounds of steel shapes have been received in the yard. The actual work of construction, however, has not yet been begun.

I estimate the percentage of work completed, based on the vessel fitted out ready for sea, to be nil.

(2) While the condition of the work is such as to render it impossible to state with any certainty the dates when the vessel will be ready for the contractors' trial and for final delivery to the Government, yet I am of the opinion that there should be no difficulty in completing the vessel ready for final delivery within the contract time, namely, January 29, 1896.

Very respectfully,

J. J. WOODWARD,
Naval Constructor, U. S. Navy, Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

OFFICE OF SUPERINTENDING CONSTRUCTOR,
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY,
Newport News, Va., July 9, 1894.

SIR: (1) In obedience to the Bureau's letter, No. 7502-94, of the 12th ultimo, I have the honor to submit the following special report of the work executed in connection with the construction of light-draft protected gunboat No. 9 to July 1, 1894:

The lines of the vessel have been laid down in the mold-loft floor and faired.

Frame and other molds completed.

The keel blocks have been laid and the building slip prepared for beginning work.

Seventy-five thousand two hundred and ninety-seven pounds of steel plates and 62,999 pounds of steel shapes have been received in the yard. The actual work of construction, however, has not yet been begun.

I estimate the percentage of work completed, based on the vessel fitted out ready for sea, to be nil.

(2) While the condition of the work is such as to render it impossible to state with any certainty the dates when the vessel will be ready for the contractors' trial and for final delivery to the Government, yet I am of the opinion that there should be no difficulty in completing the vessel ready for final delivery within the contract time, namely, January 29, 1896.

Very respectfully,

J. J. WOODWARD,
Naval Constructor, U. S. Navy, Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

OFFICE OF SUPERINTENDING CONSTRUCTOR,
BATH IRON WORKS,
Bath, Me., July 10, 1894.

SIR: In compliance with the Bureau's letter, No. 7502-94, dated June 12, 1894, relative to special report of work done on the *Katahdin*, also request that photographs be taken, I respectfully submit the following report:

Skid beams: Partly completed.
Deck stanchions: Partly completed.
Hatch coamings and canopies: Commenced.
Coal bunkers, and other fore and aft bulkheads: Partly completed.
Coal-bunker alarms: Not commenced.
Boat cradles and rests: Not commenced.
Galley inclosure: Partly completed.
Oil tanks: Commenced.
Testing water-tight bulkheads: Not commenced.

Armor and fastenings:

Three-inch side, completed.
Six-inch side, partly completed.
Two-inch deck, partly completed.
Five and one-half-inch deck, partly completed.
Six-inch deck, partly completed.

Backing plates: Completed.
Fastenings: Partly completed.
Conning tower: Waiting arrival.
Smokestack (armored): Partly completed.
Ventilators (armored): Partly completed.
Boat davits: Partly completed.
Mooring staples: Partly completed.
Hatch cranes: Plans made.
Awning and life-line stanchions: Partly completed.
Lumber irons: Not commenced.
Eyebolts in beams: Not commenced.
Ringbolts: Not commenced.
Grab rods: Not commenced.
Hammock hooks: Not commenced.
Clamps and handles for doors: Partly completed.
Sockets and levers: Partly completed.
Rounds or ladders: Partly completed.
Arms and braces for ship's bell: Not commenced.
Bands and fittings: Not commenced.
Guards for life buoys: Not commenced.
Stanchions for running light boxes: Not commenced.
Ship's bell: Not commenced.
Steering gear: Partly completed.
Warping or towing bitts: Partly completed.
Warping chocks: Partly completed.
Coaling scuttles: Partly completed.
Sea steps: Not commenced.
Hawse pipes: Partly completed.
Joiner work: Material partly worked.
Carpenter work: Nearly completed.
Swinging booms: Not commenced.
Signal and ensign staffs: Not commenced.
Shoveling flats: Not commenced.
Gratings: Not commenced.
Plumber's work: Partly completed.
Water-tight doors: Partly completed.
Sluice valves and pipes: Partly completed.
Clothes and mess lockers: Not commenced.
Deck lights: Partly completed.
Life buoys: Partly completed.
Fittings for running lights: Not commenced.
Label plates: Not commenced.
Interior communications: Not commenced.
Steam windlass: Partly completed.
Ventilation: Commenced.
Fresh-air supply to coal bunkers: Not commenced.
Drainage and pumping systems: Partly completed.

Flooding water bottom: Partly completed.
Water alarms: Not commenced.
Cleaning dirt, etc., from bilges and compartments: Partly completed.
Calking: Partly completed.

Electric lighting:

Engine and dynamo: In ship.
Insulation: Not commenced.

Steam piping: Not commenced
Painting: Partly completed.
Furniture: Not purchased.
Cooperage: Not commenced.
Boats: Partly completed.

The contractors state that the *Katahdin* "will be ready for official trial and final delivery to the Government—for trial about September 15, and for final delivery to the Government about October 1, 1894. This is based upon the supposition that all the armor for this vessel will be at these works by June 30th." Eighty per cent of the ship completed.

Photographic views and negatives for same will be forwarded per express this week.

Very respectfully,

JOHN B. HOOVER, U. S. Navy,
Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

THE LINDELL HOTEL, *St. Louis, Mo., July 3, 1894.*

SIR: In obedience to Bureau's order, expressed in letter No. 7502-94, dated June 12, 1894, I have the honor to inform you that I estimate that about 98 per cent of the work on the hull has been completed, and I estimate that the *Ericsson* will be ready for her trial some time in September, probably the latter part, and will be ready for delivery to the Government about October 1, 1894.

Very respectfully,

LLOYD BANKSON, U. S. Navy,
Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR,
Navy Department, Washington, D. C.

THE LINDELL HOTEL, *St. Louis, Mo., July 3, 1894.*

SIR: (1) In obedience to Bureau's order, as expressed in letter No. 7502-94, dated June 12, 1894, I have the honor to submit the following report of work done upon the *Ericsson* from July 1, 1893, to July 1, 1894.

(2) Joiner work in living quarters, including furniture, both fixed and portable, cork cushions, wire and hair mattresses, also pillows; woodwork in water-closets; toilet racks; shelves and lockers in pantry and galley; hooks for crew's rain clothes in torpedo room forward of No. 11 frame; chart table in conning tower, and all wooden platforms in quarters. All of this work has been begun and completed during the past year.

(3) The signal pole and all fittings, including carriage for masthead light, side-light boxes, and lightning conductor, have been begun and completed during the past year.

(4) The signal chests and side ladders have been begun and completed during the past year.

(5) The propeller guards, ship's bell and brackets for same, cover for conning tower, and all internal fittings for lowering and raising the cover, also side dead lights and air ports on forward side, have been completed.

(6) Sea steps, steps for handling torpedo crane, torpedo crane complete, sockets for same, and covers to protect the sockets in coal bunkers have been completed.

(7) The steam windlass and ground tackle have been completed and secured on board, including davit.

(8) Hatch ladders in wardroom and galley, also ladders in machinists' quarters and crew's quarters, have been completed and secured in place.

(9) All warping cleats have been cast and secured in place.

(10) The cooperage has been completed, with the exception of the leather spouts to water breaker and kegs.

(11) The tank for illuminating oil has been completed and secured in place.

(12) The galley has been completed, as well as the galley foundation, and all secured in place. The galley smoke pipe is completed, as well as the hood, but they are not yet secured in place.

(13) The voice pipes have been about 75 per cent completed.

(14) The cover for the bow torpedo-tube casting has been completed and secured in place. The torpedo track, truck, and saddle have been completed, and are nearly all secured in place.

(15) Ensign-staff socket and two cleats secured in place.

(16) Wood molding in sheer line finished.

(17) Guard-rail stanchions and awning stanchions secured in place.

(18) All deck hatches have been completed.

(19) Boiler foundations have been completed, as well as all water-tight doors and ventilators.

(20) R. F. gun platforms and foundations have been completed.

(21) All deck lights and deadlights below have been fitted in place.

(22) All steam ejectors have been completed and fitted in place. In the engine room the two ejectors have been removed to make room for the main engines and have not yet been replaced.

(23) The binnacle and hood with lamps have been completed, with the exception of the chimneys for the lamps.

(24) The fore and aft bulkheads have been completed, and water-tight sliding doors fitted in boiler rooms.

(25) The drainage system lacks but little of completion, some of this work having been done during the past year.

(26) The electric light installation has been nearly completed.

(27) All water-tight compartments have been repeatedly tested until found tight, with the exception of the tops and bottoms of the coal bunkers.

(28) All curtain rods are ready to receive the curtains and hangings.

(29) The water-closet bowls are all in place.

(30) The wardroom skylight has been completed and in place.

(31) A small amount of linoleum has been cemented on the turtle-back deck.

(32) Two small fresh-water tanks have been made and secured in place. A small hand and steam pump has been fitted in the galley and connected to all fresh water tanks, as well as to the tanks and the distiller.

(33) The coal box in the galley has been made but has not yet been secured in place.

(34) The coal-scuttle covers have been completed.

(35) Boiler-room air ducts in place and nearly completed, the work having been done during the past year.

(36) Foundations for oil tanks and evaporator and distiller in engine-room and boiler-room forward have been completed.

(37) Slop pails and wash basins have been made and completed, with the exception of soldering brass rims to the basins.

(38) Cork painting nearly completed.

(39) Ash gratings completed.

(40) Tiller ropes cut and fitted but not yet properly secured. The brass pipes and fair leaders have been completed.

(41) Awnings and side curtains have been nearly completed.

(42) Mahogany signal chest has been completed but has not yet been secured in place.

(43) Sinks and hand pumps have been fitted in pantry and galley.

(44) Boat cradles have been completed but have not yet been secured in place.

(45) Gas-pipe bunks in crew space and machinists' quarters have been completed during the past year.

Very respectfully,

LLOYD BANKSON, U. S. Navy,
Superintending Constructor.

The CHIEF OF BUREAU OF CONSTRUCTION AND REPAIR.

APPENDIX G.

U. S. NAVY-YARD, *New York, July 7, 1894.*

SIR: (1) Referring to Bureau's letter of June 12, 1894, No. 7501-94, I have the honor to make the following report and recommendations for the improvement of the construction plant of this yard, the general plan being much the same as in my reports for the last two years.

(2) In addition to the lack of certain machine tools and appliances, the chief causes that tend to reduce the efficiency and to increase the cost of working, is the scattered location of the shops, docks, and slips, and the unsuitability of the many buildings for the purposes to which they are now assigned The scattered location causes loss in transit of workmen, carrying to and from molds and templates in fitting work, the increased difficulty of proper supervision, the great loss in transporting material, particularly to ships lying beyond the dry docks, and on account of the greater number of power stations required.

(3) During the past year this Department has had in constant operation from seven to nine steam plants, requiring separate sets of firemen and engineers and resulting in great loss from unfavorable conditions under which these small engines work.

(4) It is nearly always necessary to keep one and often two of the ships under construction on the farther side of wooden dry dock, thus entailing great expense in the transit of workmen, the transportation of material, and the frequent interruption of electric light and power due to removal of the wires for docking ships. Sufficient wharfage room should be provided to give each ship under construction a berth convenient to the shops.

(5) Buildings Nos. 115, 117, and 118, used as punch shed, plate racks, electric power station, etc., are nearly unserviceable and fast becoming dangerous. In these building are located engines, boilers, and modern tools of great value which are all unduly exposed to the weather. During the past year I have been obliged to call attention to the condition of these buildings and even suggest erecting temporary water sheds over the tools, as the roof is leaking and not worth repairs. A new iron and brick building is now absolutely necessary for the proper preservation of the plant. It should have a lofty well-ventilated ground floor to be used as a punch shed, plate racks, pickling tank, etc., with a second story spanning First street to be used as a mold loft.

(6) The bending shed is a frame structure in bad condition, and is in constant danger from fire. The furnaces are too small. A new shed and furnaces are required before important new work should be taken in hand.

(7) I wish to call particular attention to my recommendations of the last two years with regard to the annoyance and delay resulting from the lack of suitable offices and drafting rooms. They are temporarily located in building No. 10. This building has been for years used for the stowage of oil in bulk. It is in bad sanitary condition, complaint being frequently made of violent headaches due to remaining a few hours at one's desk when the weather or other circumstances require the office to be closed. The great amount of smoke and soot from the smith shop opposite, that comes in at the open windows is a great detriment to the work and very annoying. The space available is entirely too small; a temporary inclosure had to be built to accommodate a sufficient number of draftsmen, and it is necessary to crowd clerks into poorly lighted and poorly ventilated rooms.

(8) The joiner shop, on account of the unsafe condition of building No. 6, had to be moved into building No. 14, leaving but a small portion available as a mold loft.

(9) Considerable improvement has already been made in various departments, including a boat storage room, a new pattern shop in building No. 12, etc., but to secure a good, efficient, and economical plant it is necessary that a fixed and comprehensive scheme should be followed. I earnestly recommend that some such scheme be adopted so that except in cases of emergency, or slight running repairs, the money for the improvement of the plant can be expended in accordance with the approved plans.

(10) The following rearrangement of the plant as shown by the chart (accompanying this report) is proposed. I recommend that its approval be urged, Part I to be carried into effect as soon as possible, Part II before any extensive new work is undertaken, and Part III from year to year as found necessary for the work directed to be done at this yard.

PART I.

(1) That as previously recommended, building No. 6—the old joiner shop—should be rebuilt and assigned to this department, the first and second story for offices, storage, and drafting rooms, as shown on plan submitted herewith. A third story

should be erected when rebuilding. It would make the temperature more uniform and afford ample dry storage room such as was not available in this department when the Bureau ordered the cellulose for the new ships to be stored at the navy-yard and which is now badly needed for the proper preservation of completed furniture. No ceiling need to be fitted to the roof. This plan provides an ample number of offices and a commodious drafting room, conveniently located and free from the dirt and soot of the shipsmith shop.

(2) That a central power station be established in building No. 10. New pumps having been proposed for the stone dry dock, the present pump room will accomodate the new pumps, the engine now in the punch shed, and the electric, hydraulic, and pneumatic plants. The present boiler room should be fitted with new boilers, and should have a ventilation shaft constructed over it, to take off the heat that otherwise spreads through the whole building. By means of shafting, wire rope and pneumatic transmission, this plant would furnish power to the punch shed, iron plating shop, smith shop, paint shop, foundry, plumbing joiner, pattern, and block shop, thus reducing the power stations to two, the other being at the saw mill, in which new and efficient boilers and engines have been installed since my last report. New boilers of a modern type have also been placed in the smith shop. It will soon be necessary to put new boilers in the pattern and plumbing shops. For this purpose two boilers lately used in the saw mill and old paint shop can be utilized.

(3) The compartment next to boiler room, on first floor of building No. 10, should be used as a central tool house. The rest of the building should then be used as a joiner, cabinet-maker's, and block shop. In that case the upper floor of building No. 14, temporarily in use as a joiner shop, would be restored as a mold loft, and the lower floor would be used for stores.

(4) A new building is absolutely necessary to replace Nos. 115, 117, and 118, the lower floor to be used as punch shed, plate rack, pickling tanks, etc., and upper floor as mold loft.

(5) By removing certain ship-fitting tools from the iron-plating shop to the punch shed sufficient space is acquired in the former for an efficient brass-finishing shop.

(6) A shed is urgently needed for shipwrights at each dry dock. The old oakum mill has been assigned for this purpose at the wooden dock, but it has not yet been repaired, and is not in proper condition. The shed for the new dock now building should be placed as shown on the chart, and fitted with a few light tools suitable for work on repairs to ships in the docks.

(7) Building No. 9, the old cooper and pattern shops, was originally assigned to this department for storage purposes, but later a portion was given to ordnance. When the change was made all construction and repair stores were put in one side, overloading the floor and a portion of it has now fallen into the cellar, carrying with it the stores, including a large quantity of iron beams, plates, bars, etc. For this reason additional store room is now required, and if a new boat and spar shed is provided the old building could be utilized for this purpose.

(8) At present there are no suitable arrangements for marking the beginning and end of working hours. There is one large bell and some scattered whistles, entirely unconnected with each other, with no means of enabling them to sound together at the exact hour. I recommend a system of large electric gongs, one in each shop, on every ship under construction at each dry dock and at certain points in the open air, so that every workman can be sure of the exact time to start to leave his work. These gongs should be sounded automatically by a clock regulated daily from the standard time as received by telegraph.

PART II.

(9) New smith shops have been proposed for the steam-engineering department. This would leave the portion of No. 1 now used by the steam-engineering department available for use as the construction foundry, and it should be assigned to this department for that purpose. As this building was formerly used as a foundry, and the cupola, brass furnaces, coke oven, and steps for cranes are still in place, it could be readily fitted up. The present foundry should be used as a galvanizing shop.

(10) A new bending shed and flange-turners' shop, also an angle smithery, should be erected where shown on chart.

This takes up the slip recently occupied by the *Intrepid*, only available for a small vessel, but still leaves three others.

(11) The present boat-shop and spar-shed building is old and unsuitable for the purpose. A new one should be built, as shown on the chart, with a canal 12 feet in width, connecting it directly to the Wallabout, so that boats and spars can be floated directly into the building. In order to best utilize the space the sea wall between the two dry docks should be straightened, which would also dock a large ship. The present shop could then be used for boat stowage below, with overhead traveling cranes, and the upper floors as a lunch room for workmen.

PART III.

(12) An experimental tank should, in my opinion, be constructed at this yard. A site for the same, together with plans and estimates, could be furnished at any time. Forty thousand dollars would probably cover cost of tank and appliances.

I most earnestly recommend that all new buildings should be substantially constructed of brick and iron. Light wooden structures for machine shops furnish very bad support for the heavy shafting required, are soon in bad repair, and are in constant danger from fire.

The scheme proposed above will, as soon as building No. 6 is repaired, provide good offices and drafting rooms, allow the transfer of joiner and block shops, provide a brass-finishing shop, and establish a central power station.

At the end of a few years it will provide a compact and most efficient plant, capable of making all repairs required, and at the same time carrying on such building programme as would probably be assigned to this yard.

To carry into effect part 1 of the above-shown scheme the following changes and additions are required. They are now necessary for efficiency and economy in carrying on the new work in hand and to put the plant in a condition to expeditiously and economically make such repairs on the new ships as will probably be demanded of this yard.

ESTIMATED COST READY FOR WORK.

The ship yard.

1.	Portable hoisting engine	$1,200
2.	Five standard-gauge push cars	200
3.	The caissons at each dock should be altered and a track added joining the yard railway system for transportation of material on push cars or trucks	
4.	Pneumatic capstans should be placed around all dry docks	

Machine iron-plating shop and brass finishing shop.

5.	40-inch planer, to plane 10 inches long, with chucks, etc	3,200
6.	One 16-inch engine lathe	500
7	One 8-inch brass-finishers cabinet turret lathe	900
8.	Three upright drill presses	1,500

Blacksmith shop.

9.	350-pound steam hammer, with plain dies	720

Tool room.

10.	Tool grinding machine	1,460
11.	Grindstone dresser	30

Pattern shop.

12.	Face-plate lathe	400
13.	Three trimmers	100
14.	Handsaw setting machine	20
15.	Handsaw filing machine	25
16.	Establishing central power station in building No. 10	60,000
17.	Repairing building No. 6 for offices	
18.	New building to replace Nos. 115, 117, and 118	
19.	Electric gongs, to indicate the beginning and end of working hours	1,800
20.	New boilers in plumbing shop, for which two boilers now on hand could be used	600

Part II requires the following changes and additions, all of which should be made before any extensive new work is taken in hand.

21.	One angle furnace	$6,000
	Revolving beam forge	200
22.	Hydraulic plate bending and flanging machine	15,000
23.	New forges for angle smith shop	600
24.	Two new countersinks	750
25.	Double angle shears	1,800

26. Pneumatic system for working capstans at docks and calking tools on ships $15,000
27. New bending shed .....
28. New angle smith shop .....
29. New shiprights shed at each dry dock .....
30. New shed for shipwrights at dry dock now building, to include machine shop, with a few small tools .....
31. New building: boat shop and spar shed .....

Part III requires, in addition to the above items, the following changes to put the plant in first-class order, capable of carrying on expediously and economically all repairs that would probably be required by a fleet of modern ships, and at the same time carrying on a building programme of three ships in four years.

32. An experimental tank, with all necessary machinery and appliances .. $40,000
33. I earnestly renew my recommendation of last year that a building be suitably fitted up and assigned for the employés as a lunch room. A suitable person should be selected, whose duty would be to heat the building and keep it in proper state of cleanliness. It return for these services this attendant should be allowed or granted the privilege of selling tea, coffee, and such light food as might be suited to the wants of the men, the prices and character of the same to be regulated by the commandant. The room to be so arranged that men bringing their own lunch shall be equally as comfortable as those who buy. I recommend this arrangement in the interest of morality, economy, and cleanliness.

The foregoing estimates have been without drawings or specifications, and can only be considered as approximate.

Plans and estimates will be furnished when required.

Very respectfully,

F. L. FERNALD,
Naval Constructor, U. S. Navy.

The COMMANDANT NAVY-YARD, NEW YORK.

U. S. NAVY-YARD, NORFOLK, VA.,
July 3, 1894.

SIR: In compliance with the instructions of the letter of the Bureau of Construction and Repair No. 7501-94, of June 12, 1894, I have the honor to submit the following suggestions for the improvement of the construction plant at this navy-yard, and to enable the work of this department to be performed with increased economy and rapidity.

As the work in this department is in many respects dependent upon the general arrangement and facilities of the navy-yard, I have included certain recommendations upon matters not immediately under the direction of the Bureau of Construction and Repair, and in addition to the necessities of the shops of this department.

(1) Dry dock No. 1 (stone dock) is limited in capacity to vessels of the size of the *Atlanta*, and if lengthened 100 feet could be used for all the cruiser class of vessels, which would increase its usefulness to a very large extent.

(2) Dry dock No. 2 is so constructed at the gate that it cannot be used for docking the battle ships now building, and it will be exceedingly dangerous to attempt the docking of the *Texas* or armored cruisers in this dock when at the load draft. An additional dry dock of sufficient size for these vessels is recommended, and the importance and necessity of beginning at the earliest possible moment the construction of such a dock at this navy-yard can not be overestimated. An available and desirable site adjoins dry dock No. 2.

(3) The difficulty of berthing ships at this navy-yard, owing to insufficient wharfage, has been frequently experienced during the past year, and the necessity for berthing ships at a considerable distance from the shops has delayed and increased the cost of the work of repairs. It has occurred several times during the past year that both dry docks were in use, and every berth at the wharves occupied. On two occasions it was necessary to berth a ship at St. Helena, opposite the navy-yard. It is recommended that the timber basin, no longer required for the original purpose, should be cleared out and converted into a fitting basin by building a wall and gate across the continuation of Rowan avenue, utilizing that portion of the dock to to the west for spar timber, the eastern portion to be deepened and provided with retaining walls and a pontoon bridge at the eastern end.

(4) The shipfitters' shop has proved of entirely inadequate capacity for carrying on the work of the department. It is too small for the machines it now contains, and the equipment of tools is not more than half what it should be. My recommendation of last year in regard to this matteris, therefore, renewed and urged,

especially in view of the fact that the smithery (building No. 9) has continued to develop serious defects, and, in order to obtain necessary space for the tinners, the tin shop has been moved to the spar shed (building No. 28).

It is therefore suggested that a new shipfitters' shop be erected in the vacant lot adjacent to the timber basin, which shall have wings and galleries, and be fitted with traveling cranes, elevators, and all modern appliances, electric plant, new shop engine and boilers, and additional machine tools, and be connected with the railroad system of the yard.

In building No. 42, thus vacated, it is proposed to locate the foundry at the north end, utilizing the present chimney, enlarging the plant with cupolas and cranes, the south end of this building to be rearranged in two stories for plumbers, coppersmiths, tinsmiths, and pipe-fitters.

Building No 9, the present smithery, to be torn down and a new one erected having iron framework and corrugated iron sides and roof, and be supplied with a 5,000-pound steam hammer, a new reverberatory furnace, and the jobbing, angle, beam forges to be rearranged.

Estimated cost of changes, and installation of tools, rearrangement of shop interiors, and new tools and equipments, $150,000.

(5) When ships in dry dock or in the vicinity are undergoing repairs, much time is lost by the workmen in going to and from the shops, which are 2,000 feet distant. It is suggested that a one-story shop, with a shed at each end, be built between the two dry docks and supplied with a small outfit of machinery and a motive engine of 40-horse power, for which steam could be obtained from the pump house. The sheds would provide convenient stowage for docking gear and cover for stage plank shores, horses, etc., which deteriorate rapidly from exposure. The estimated cost of machinery for this shop and for erecting and installing the plant is $20,000.

(6) A locomotive 10-ton traveling crane and car would greatly reduce the cost in handling the material of this department, $4,300.

A floating, self-propelling derrick with revolving jib, having a capacity of 80 tons, is very necessary and could be built and maintained by this department to advantage. The facilities now available for handling heavy weights are inadequate to the work of the yard, $75,000.

Summary.

4. Changes and installation of tools, rearrangement of shop interiors, new tools and equipments	$150,000
5. Machinery for new one-story shop, to be located between the two dry docks, and for erecting and installing plant in same	20,000
6. A locomotive 10-ton traveling crane and car	4,300
7. A floating, self-propelling derrick, 80 tons capacity	75,000
	249,300

Very respectfully,

FRANCIS T. BOWLES,
Naval Constructor, U. S. Navy.

The COMMANDANT NAVY-YARD, NORFOLK, VA.

NAVY-YARD, MARE ISLAND, CAL.,
July 9, 1894.

SIR: In reply to letter No. 7501-94 of the Bureau of Construction and Repair of June 12, 1894, directing a report embodying any suggestions relative to the improvement, alteration, or addition to the construction plant of the yard that will enable work to be performed more economically, or more promptly, I have the honor to submit the following report:

The principal duty required of the construction and repair plant at this yard has been and will be in the near future to make repairs to naval vessels, and it should be immediately put in a condition to meet the demands of such work, no matter how extensive it may be, with due economy and utmost dispatch. At the same time the yard should be in a condition to carry on the building of at least one vessel of the battle ship class, and its plant should be ample in size and character for this work.

To meet these requirements this yard is supplied with only one dock, which is in nearly constant use the year round, and in case of any accident to its caisson or pumps, a serious delay would occur in the repair of vessels.

Another dock should be built at this yard, and in the meantime the present dock should be fitted with power capstans at the head and mouth to properly and safely handle vessels in docking and undocking. Attention is called to the fact that these power capstans have been found necessary and have been fitted at the Norfolk and New York yards, while at this yard, where there is much greater need for them, owing to the absence of a tug, only hand capstans have been supplied and one of these is not even secured in place.

Owing to the mud at the entrance of this dock the caisson can be removed only at high water, thus limiting seriously the opportunities for docking, and from this cause delays have occurred for as long a period as three days, otherwise overtime work at very unreasonable hours would have been necessary. This could be remedied by the addition of another strake to the body of the caisson at an estimated cost of $3,000.

The construction plant at this yard is in need of many improvements to put it in an efficient condition, and in this connection attention is called to the previous reports of Naval Constructors Linnard and Taylor and the report of the board which recently investigated this yard.

My recommendations in detail are for the different shops as follows:

There is no ship-fitters' shop at this yard and work of this class has so far been done by a few tools which have been set up in the end of the smithery. Machine tools bought for this work have been stored away in the lower part of building No. 39 for several years, waiting for the building of a proper shed to erect them in.

On plan No. 1553, accompanying this, is shown the proposed location of the ship-fitters' shed, and it is earnestly recommended that this shed may be built and the tools promptly erected therein. A suitable shed could be erected at a cost of not exceeding $20,000, and the installation of belting, shafting, and erection of tools would cost about $9,000.

The following additional tools are needed to properly equip the ship-fitters' shop when erected:

One hydraulic angle shears	$1,750
One hydraulic horizontal punch	1,500
One hydraulic vertical bending press	2,000
One hydraulic horizontal bending press	2,000
One 22-foot plate edge planer	3,200
One combined punch and shears	1,600
Six vertical stational drills	750
Two jib crane countersinks	800
Two portable hydraulic riveters	1,600
One cold circular saw	1,600
One set mast rolls	1,700
Total	18,500

The angle and plate furnaces, with the oil reservoirs, have been completed, and about one-third of the necessary bending slabs have been cast; the work of completing these should be hastened as much as possible, and this plant put in a condition for immediate use.

Nothing has been done toward providing a scrive board other than to locate it on the plans. It is highly necessary that this scrive board should be built at once, and a temporary wooden shed should be erected over it to answer until an iron shed similar to the one just erected over the furnaces is erected to replace it.

The erection of an iron shed here as suggested is very desirable, as it will house the scrive boards, afford a cover for the molding sand, flasks, and fuel for foundry and smithery, and a good shed for assembling work in wet weather.

The estimated cost of completing the bending slabs and scrive board is $7,500, and the permanent shed would cost about $6,500.

There is no galvanizing plant at the yard, and one is urgently needed. It is proposed to locate it where shown on the plans, and it should be built at once. The present makeshift arrangements are expensive and very slow, and their duration only a matter of a few days.

The present foundry (see plan) is much too small, but is fairly efficient when only a small amount of repair work is on hand. When the ship-fitter's tools have been moved to the proposed shed, the foundry should be moved to the wing of building No. 69, as shown on plan, and a proper cupola and set of brass furnaces be erected. Estimated cost of moving and refitting foundry, $6,000.

The smithery is in fairly efficient condition for the present needs, but a reverberatory furnace should be built so that the scrap can be hammered in shape for use in large forgings, which would save much time in getting the necessary material for such work. A 1,000-pound steam hammer should be installed for use in connection therewith. Estimate for furnace, $4,000; estimate for steam hammer, $2,000.

The joiner-shop tools are old and much worn, and the following new ones are necessary:

One mortise machine	$300
One tenon machine	300
One molding machine	400
One jig saw	100
Total	1,100

The floors in the boat and block shops are very much rotted and are not in a condition to take the necessary tools. New flooring is needed at once. Estimated cost, $2,500.

The spar shed is very much lumbered up with old blocks and spars, and it should be cleaned out by providing space elsewhere for the raft of old spars and multitude of old blocks. Estimated cost for labor and material, $250.

The paint shop is at present located on the upper floor of building No. 39, together with the varnishing and polishing room for furniture. It is recommended that the old disused machinery be moved out of the brick building No. 89, and the building be turned over to this department for use as a paint shop. It is admirably adapted to this purpose, as it is isolated from all other buildings, and is a safe place for the storage of the oils and paints in use. In case of a fire starting in the present location of paint shop, with a large amount of furniture in the building, the total destruction of the building and of the adjacent joiner shop would be very probable.

The space in building No. 39, thus vacated, it is proposed to utilize for the present varnishing room, for the storage of patterns on racks where they can readily be gotten at, and for an office for the assistant naval constructor on outside work.

The present pattern shop is efficient, but there is no space for arranging the patterns, and so they are stowed about indiscriminately in the dark loft over the pattern shop. It is proposed to stow these on racks in the end of building No. 39 when paint shop is removed, and to classify and arrange them to prevent duplication of patterns.

The machine shop is not in a condition to meet the demands of the work which are now being made upon it, and is much in need of additional tools. The following should be installed at once, to enable it to carry on the work of the present and immediate future:

One horizontal boring and drilling machine	$1,800
One slotting machine	4,000
One double shaping machine	1,300
One engine lathe	1,650
One universal radial drill	1,400
Total	10,150

POWER PLANT.

At the present time three sets of engines and boilers are called into service to furnish the power necessary to do the work in the various shops in this department. They are located as shown on plan No. 1553, forwarded herewith.

The engine located between buildings Nos. 69 and 70 is practically new and of the Corliss compound type, capable of an output of 250-horse power, an amount ample to supply all the power required by this department.

It is recommended to centralize the power at this point and to install a system of electric generators, and replace the engines and boilers now used at the joiner shop and at the sawmill by electric motors, at the same time providing the necessary electrical energy for portable drills, for use on ships building and repairing, and also lighting the same while work is going on.

This change can be made at an estimated cost of $9,200 for material and $1,300 for labor; total labor and material, $10,500.

OFFICES.

The offices of this department now occupy five rooms of the lower floor of the main office building. This situation is far from being central and necessitates much lost time in running to and fro between workshops, ships, and the offices.

I beg to call attention to a more desirable location between buildings Nos. 69 and 70. At a cost of $2,100 for labor and $2,700 for material the offices could be transferred to this point. There is sufficient room to accommodate all the office force, including draftsmen, with the arrangement as shown on the accompanying plans. This change is very desirable.

BUILDING SLIPS.

At present there is no building slip in a condition to receive blocking in case it is decided to undertake the construction of new vessels.

It is suggested that two slips be built as shown on the plan, to be of permanent material, such as granite.

The recommendations for additions and improvements here made are summarized under three heads: (1) Immediately necessary; (2) necessary immediately, but can not be utilized until ship-fitter's shed is built; (3) required immediately, but coming under cognizance of Bureau of Yards and Docks.

(1) Immediately necessary:

1. Repairs to main engine		$800
2. Completing slabs and scrive boards		7,500
3. Galvanizing plant		3,000
4. Joiner-shop tools:		
One mortise machine	$300	
One tenon machine	300	
One molding machine	400	
One jig saw	100	
		1,100
5. Arranging patterns		250
6. Clearing out spar shed		250
7. Removing and fitting up paint shop		500
8. Machine-shop tools:		
One horizontal boring and drilling machine	$1,800	
One slotting machine	4,000	
One double shaping machine	1,300	
One engine lathe	1,650	
One universal radial drill	1,400	
		10,150
9. Installation of electric-power plant		10,500
Total		34,050

(2) Necessary immediately, but can not be utilized until ship-fitter's shed is built:

1. Moving and refitting foundry		$6,000
2. Building reverberatory furnace		4,000
3. 1,000-pound steam hammer		2,000
4. Ship-fitter's tools:		
One hydraulic angle shears	$1,750	
One hydraulic horizontal punch	1,500	
One hydraulic vertical bending press	2,000	
One hydraulic horizontal press	2,000	
One 22-foot plate edge planer	3,200	
One combined punch and shears	1,600	
One cold circular saw	1,600	
Six vertical stationary drills	750	
Two jib crane countersinks	800	
Two portable hydraulic riveters	1,600	
One set mast rolls	1,700	
		18,500
5. Installation of shafting and tools in proposed ship-fitter's shed		9,000
Total		39,500

(3) Required immediately, but coming under cognizance of Bureau of Yards and Docks:

1. New floors in boat and block shops	$2,500
2. Ship-fitter's shed	20,000
3. Shed for scrive board	6,500
4. Hydraulic capstans at dry dock	1,500
5. Fitting up new offices	4,800
6. Extra strake to body of caisson	3,000
Total	38,300

Respectfully submitted.

S. W. ARMISTEAD,
Naval Constructor, U. S. Navy.

The COMMANDANT, NAVY-YARD, MARE ISLAND, CAL.

NAVY-YARD, LEAGUE ISLAND, PA.,
July 18, 1894.

SIR: In compliance with the Bureau's letter No. 7501-94, desiring a report relative to the improvement, alteration, or addition to the construction plant of the yard, etc., I respectfully submit the following suggestions and plans, designated as follows:

1. Plan of construction buildings.
2. Engine house.
3. Boiler house.
4. Ship-fitting shed.
5. Ship-fitting shed, cross section.
6. Smitheries.
7. Smitheries, cross section.
8. Boat shop and mold loft.
9. Boat shop and mold loft, cross section.
10. Furnaces.
11. Furnaces.
12. Furnaces, details.

On plan 1 is shown so much of the yard as is chiefly occupied by the construction and repair department. The dotted lines in black represent the improvements recommended by the board October 10, 1889, and the additional buildings, shown in red, suggested in this report, conform in general with the plan of said board.

It will be noticed that these additional buildings are located with a view of bringing the several shops as close together as is practicable, thereby facilitating general supervision, and also to locate the shops within easy reach of the docks and building slips.

Another advantage obtained by this concentration of workshops is that the steam power which runs the tools and other appliances in one shop may be extended to adjoining buildings, thus effecting a saving in first cost in engines and boilers and greatly reducing the annual cost in supplying steam power for the several shops.

Taking up the several proposed improvements in their order of immediate importance, I beg leave to invite attention to the immediate need of an engine house and boiler house.

The fine 150-horse-power engine, for running the iron-plating shop, installed in 1893, has been under a temporary wooden shed ever since. I would respectfully recommend that permission and funds be granted to build a permanent building, such as is shown on plan 2; the estimated cost being $6,800.

The boilers (2 in number) which were erected last year, and are to supply the sawmill and ship-fitting shop, with power, are housed in a temporary wooden structure, which is very much cramped and dangerous in case of fire; it is therefore recommended that a building, such as shown on plan No. 3, be erected. This building, composed of iron and corrugated galvanized iron, can be put up for $3,400.

SHIP-FITTING SHED.

To carry on repairing work upon ships at the wharves or in dock, with dispatch and economy, a ship-fitting shed, as shown on plans 4 and 5, is recommended. The proposed structure is 274 feet by 100 feet and in close proximity to the ship-fitting shop. Only iron and glass is used in its construction. The sides consist solely of sliding doors, each door sliding inside and outside of the posts. This arrangement is labor saving, in that it is possible to take work out of the building at any part of it with less handling than where doors are placed at certain intervals. Then, again, light and ventilation can be had to a greater extent, making it convenient for carrying on such work as can not be accommodated in a ship-fitting shop. It is suggested that under this shed should be located the furnaces and bending slabs, the scrive board, plate-pickling baths, hydraulic keel-plate bender, and such smaller tools as punches, shears, multiple drills, etc., as require considerable space when working long plates and angle bars.

It is further contemplated to place the brass foundry, tinning, plumbing, and galvanizing shops under the roof of the ship-fitting shed. The present brass foundry is located near the steam-engineering buildings, and is not in a conveniene place. The house is of frame, and as all the buildings on the yard ought to be made as nearly indestructible as possible, it is recommended that a new brass foundry be built upon the space designated on plan 4, to be constructed of the same material and uniform with the new boiler house proposed. A tinning and plumbing shop has been fitted up in the north end of the blacksmith shop, and will suit the purpose for some years, but the most suitable location of the shops is undoubtedly that indicated on plan 4, incorporated under the ship-fitting shed.

I beg leave to urgently recommend an appropriation for this ship-fitting shed, as it must prove itself a great convenience for work that can not well be carried on in the ship-fitting shop, and it would do away with the erection of detached shops and buildings, such as the boiler house, brass foundry, and plumbing, tinning, and galvanizing shops. The estimated cost of this ship-fitting shed is $58,221; the cost of the proposed new boiler house is $3,400. Allowing $3,400 for each of the other two buildings covering the brass foundry, and the plumbing, tinning, and galvanizing shops, there is a total of $10,200. If these buildings were erected, and in the course of time it is found desirable to erect a ship-fitting shed, then these buildings would have to be removed, and the first outlay would be an almost entire loss.

BRASS FOUNDRY.

One of the first needs is that of a brass foundry. As stated in the report of July 7, 1893, that of the steam engineering might be repaired and made to answer temporarily. It is equipped with cranes, drying ovens, as well as smelting furnaces. None of these appliances, however, have been in use for a long time, and the foundry has not been in operation for about ten years. It is therefore not possible to state precisely what its actual condition is without a thorough survey, and there are no crucibles, sand tools, and other requisites with which to ascertain its worth. I therefore recommend the erection of a brass foundry, to be built of iron, and to have it equipped with all the necessary appliances for supplying the fittings of ships.

BOAT SHOP.

There is no boat shop proper at this yard. The old frigate house has been utilized as a boat shop, but at considerable disadvantage as regards economy and dispatch of work. The building being of frame, and approximately 50 years old, can not last much longer at its best. Although its supports have been looked after and repaired, where found needed, during the past year, the building is not as safe as it should be. The boat shop, located in the second story, is unhandy for the admission and exit of boats; it is dark in the shop, and the floor is shaky and unreliable. The danger of the building collapsing under a strong wind, or of being destroyed by fire, is advanced as a reason why it should be abandoned and a suitable place built, where human life and Government property would be safe. I therefore recommend the erection of a brick building 400 by 65 feet exterior dimensions, two stories high, to be located as shown on plan No. 1; the ground floor of this building to be used, as shown on plan 8, as boat-building shops, boat repairing and painting, and the north end as copper and block shops. The engine running the joiner-shop tools is located only 60 feet to the east of the proposed boat shop, and this engine is of sufficient capacity to run all the machine tools and saws in the proposed shop.

As the erection of this boat shop would necessarily come under future permanent improvements, and as this old frigate house will last but little longer, I would urgently recommend that authority be given to utilize the lower floor of the building designated on plan No. 1 as mold loft and joiner shop. To put this floor in condition for such purpose, it will require a new flooring of wood, the present flooring being of cement and in very bad condition.

The light of this floor is poor, owing to the small size of the windows; but, as these windows are built in pairs, this objection can be readily overcome by installing one large window in the place of the two small ones. The estimated cost of making this change would be $9,700. Upon the erection of the proposed boat shop and mold loft, this floor could be utilized to great advantage for the stowage of boats, these buildings being located within a short distance of each other and in close proximity to the docks.

MOLD LOFT.

The present mold loft in Construction and Repair building is entirely unsuited for the purpose intended. The constructor's offices, clerk's office, drafting rooms in the north end take up 75 feet in length. The joiner shop takes in 208 feet and only 110 feet remain, which is partly used for storage of furniture. The floor is badly worn and could not be used for laying off purposes without entire renewal. It is, besides, too small to be used as a mold loft, and as a shelter is much needed for the storage of furnature, it is well adapted for the purpose. The upper story in the proposed boat shop has been designated for a mold loft.

SMITHERY.

The present smithery is a frame building constructed about eighteen years ago. It is 254 feet by 40 feet, and 20 feet high under the eaves. Three years ago this building was thoroughly repaired, and is probably good for eight or ten years. The north end contains the engines and boilers, occupying 64 feet in length, next to which a space of 28 feet has been fitted up as a tinning, plumbing, and copper shop, leaving 191 feet for smithery proper. This space accommodates 18 fires and 3 steam hammers of 200, 400, and 800 pounds respectively. These hammers, though, are very much out of date and of the slow-striking type. I would therefore recommend the purchase of two additional ones of 500 and 1,000 pounds respectively. Estimated cost of hammers, $1,000.

I would also recommend canopies fitted over each forge to carry off the smoke, which accumulates in great quantities when fires are started. Estimated cost of canopies, $650. The capacity for work is very limited, owing chiefly to the lack of heavy hammers; nor would it be possible to introduce any of the larger sizes because of the limited space in every direction. The chief objection to this structure is the material of which it is built, and it would not be advisable to either enlarge it or introduce any very large hammers. While it is not likely that a suitable shop will be built for some years, I have anticipated such a contingency and outlined in a general way my idea of a smithery capable of turning out all the work that may be demanded from a thoroughly equipped navy-yard. Its proposed location is indicated on plan 1, and general plans and arrangements are shown on plans 6 and 7. It contemplates two separate shops 400 feet in length, with an L at each end of 56 feet, and 75 feet outside width.

These buildings are placed so as to form a quadrangle with a driveway of 20 feet between them, giving access to the interior space between the buildings, 125 by 250 feet. The engine and boiler house are located in this courtyard. The west building is to be used for heavy forging and angle smithery. It will contain four reverberatory furnaces, assorted heavy steam hammers, and an overhead traveling crane operated by electricity. To prevent as much as possible the accumulation of smoke, which usually fills the shops in the morning when fires are started, and during muggy weather when there is little or no draft, it is proposed to fit a canopy over each fire, to which a pipe is attached, the latter communicating with a central flue running under ground through the entire length of the shop, out into the smokestack in the yard. I believe that a suction of air through this main flue, induced by fans, would greatly reduce, if not entirely remove, the dense smoke which otherwise would have no outlet, except through the roof, skylight, or open windows. The east building is designed for general ship-smith work, and contains 61 forges, steam hammers, and other appliances, and sufficient space for material required to be kept on hand for daily use. The estimated cost of these two smitheries is $310,000.

SHIP-FITTING SHOP.

As the work in this shop requires considerable handling from one machine to another while being worked, and the introduction of heavy armor for our modern ships necessitates the introduction of some permanent mode of lifting and carrying this work, I would therefore recommend the installation of an electrical traveling crane of 10 tons capacity, also a 80-horse-power generator for furnishing the power to this crane. I would further recommend that the framing for carrying this crane be built entirely separate from the main framing of the building; this could be accomplished by building box columns and stepping them on the same foundation as supporting columns of building. These columns would receive girders for carrying crane, and be securely tied to main columns with tie plates, making the whole a strong and safe construction.

Estimated cost of crane	$12,800
Estimated cost of generator, wiring, etc	2,550
Estimated cost of columns, girders, etc	7,000

The following additional tools are recommended to be purchased for this shop:

Two 16-inch screw-cutting lathes, at $500	$1,000
One 20-inch screw-cutting lathe	800
One acme double-head screw-cutting machine	600
Two radial drill presses, 60-inch, at $1,100	2,200
One triple-gear shaping machine	400
Three grinding-machine emery wheels, at $100	300
One 2 by 24 turn-table turret lathe	1,100
One hand bending rolls, 4-inch by 48-inch	100

One centrifugal chip and waste cleaner	$125
One multiple drilling machine	2,800
One grindstone, with iron frame, complete	80
One metal band saw	400
One Detrick & Harvey open-side planer	3,000
One plate shearer, 8 inches between housing	4,000
One heavy vertical milling machine, with angular motion	1,200
One small milling machine	300
One small drill press	100
One small engine lathe	260
Three sets Morse twist drills, ¼ inch to 1¼ inch	75
Total	18,840

The following tools and appliances under the proposed ship-fitting shed are recommended:

Plate and angle furnaces	$9,000
Bending slabs	4,800
Hydraulic keel plate bender	8,000
Tanks and cranes for pickling plates	2,500
Total	24,300

Plans 10, 11, and 12 show general outlines of proposed angle and bar furnaces, similar to those in use at Sparrow's Point. There is, however, a difference of opinion as to the advantages claimed for the cylindrical steel or iron shell angle furnace, and also as to the benefits from the use of petroleum for heating, over the usual kind of furnaces and fuel. My preference leans toward coal for heating; the disadvantage of the dust being more than compensated for through the simplicity and absolute safety of its use against the risk of using an inflammable oil, and the liability of pipes and valves getting choked and failing to work when perhaps most needed.

In conclusion, I beg leave to summarize the recommendations contained in this letter under "Immediate requirements" and "Future improvements," in the order of their importance.

Immediate requirements.

Permanent building improvements:	
Engine house	$6,800
Boiler house	3,400
Brass foundry	3,400
Alteration to construction building for boat shop	9,700
Total	23,300
Tools and appliances:	
Tools for ship-fitting shop	18,840
Furnaces	9,000
Bending slabs	4,600
Pickling tanks	2,500
Fitting up brass foundry, tools	1,500
Steam hammers	1,000
Canopies over blacksmiths' forges	650
Total	38,290

Future improvements.

Permanent buildings:	
Ship-fitting shed	58,221
Boat shop and mold loft	150,000
Smitheries	310,000
Total	518,221
Tools and appliances:	
Hydraulic keel-plate bender	8,000
Electric motor plant	10,000
Traveling crane for iron-plating shop	12,800
Columns and girders for carrying crane	7,000
Generators for furnishing power to crane	2,550
Total	40,350

Recapitulation.

Immediate requirements:	
Total for permanent building improvements	$23,300
Total for tools and appliances	38,290
Sum total for immediate requirements	61,590
Future improvement:	
Total for permanent buildings	518,221
Total for tools and appliances	40,350
Sum total for future improvement	558,571

Very respectfully,

J. FEASTER,
Naval Constructor, U. S. Navy.

The COMMANDANT.

No. 819, COMMANDANT'S OFFICE,
NAVY-YARD, LEAGUE ISLAND, PA.,
July 20, 1894.

Approved and forwarded to the Bureau of Construction and Repair. If only one building should be allowed I consider the "ship-fitting shed" the most important.

N. H. FARQUHAR,
Captain, Commandant.

NAVAL CONSTRUCTOR'S OFFICE, U. S. NAVY-YARD,
Boston, July 12, 1894.

SIR: (1) In compliance with Bureau's order No. 7501-94, dated June 12, 1894, I have the honor to submit the following report, suggesting alterations and additions to construction plant which will, in my opinion, enable the work to be performed more promptly and economically than at present.

(2) Three plans, A, B, and C, relative to ship-fitting machine shop, showing structure of building and location of tools are herewith submitted.

Plan A shows position of tools as at present. Plan B shows proposed change in line shafting, location of tools, etc. Plan C gives transverse sections at various points in building; shows lead of and quarter turn in main driving belt required by change in direction of line shafting proposed. Plan D shows proposed building for plate rack and forge shed, with its location relative to adjacent buildings. Blue print E shows end elevation of building No. 36, with proposed door shown in red.

SHIP-FITTING MACHINE SHOP.

(3) Proposed change in line shafting tools, etc: By reference to plan A it will be readily seen that no adequate provision has been or can be made for transportation of material to and from tools either by traveling crane H or trolleys, owing to location of beams, shafting, belts, etc.

Plan B provides for a change in run of line shafting from a transverse to a longitudinal position in shop turning and rearranging the tools to correspond, cutting of center portion of and lowering beams, providing platforms and walks over same, thus allowing the use of traveling crane H (now useless), and for longitudinal and transverse trolleys to material and tools. The building should also be brought down to grade, and the railroad track continued down its center, as shown on plan. It is therefore recommended that plan B be adopted and changes made to correspond therewith.

Estimated cost.

Labor	$3,540
Material	2,214
Total	5,754

PLATE RACK AND FORGE SHED.

(4) An iron building for storage of plate steel angles and other shapes, fitted with a traveling crane and the necessary rack for holding plates on edge, is recommended (see plan D). It is also recommended that the extension E (see plan D) be utilized as a forge shed and fitted with a rotary crane, for convenience in handling plates, beams, etc.

Estimated cost.

Labor	$12,707
Material	5,429
Total cost, buildings	18,136

(5) Proposed addition to boiler and engine room. With a view to providing room for an additional boiler, the electric, hydraulic and air-compressed plant, it is recommended that the present frame engine and boiler house (see plan A) be removed, and that the space between the tool room T and bending-roll shed U, 68 feet 1¾ inches in length, be utilized for the purpose of having a transverse section like N O (see plan C). In order to bring the above plant wholly under the eye and control of engineer in charge, it is recommended that the end of tool room V W be moved to X Y (see plan B).

Estimated cost.

Labor	$3,520.00
Material	1,448.21
Total	4,968.21

PICKLING TANKS AND CONNECTIONS.

(6) The locations of pickling and fresh-water tanks are shown on plan D, at end of plate rack, and are located with a view to convenience in handling plates. Plates selected for use are taken from rail truck as it leaves the building by an 18-foot jib crane (available for the purpose) and readily deposited in either tank. These tanks will be of the following (in the clear) dimensions: Length, 25 feet 3 inches; breadth, 2 feet 2 inches; depth, 6 feet 6 inches; to be built of 3-inch white pine and lead-lined.

The tank pits will be brick-lined, laid in cement, and made water-tight.

Estimated cost.

Labor	$658
Material	620
Total	1,278

BOILERS.

(7) Boilers Q and R, now in position (see plan A), require repairs; the water legs leak, and steam above 70 pounds pressure is forbidden. These boilers when in good condition will not furnish sufficient steam for all purposes, when shop and sawmill are in full operation. It is therefore recommended that the two boilers, nearly new and no longer required for dry-dock use (new boilers and engines having been supplied), be taken for the purpose, boiler R be thoroughly repaired, and all put in good condition.

Estimated cost for transportation, uptake connections, and repairs.

Labor	$1,025
Material	250
Total	1,275

(8) Proposed doors in end of building No. 36 (joiner shop): In the construction of this building no provision has been made in size of doors in basement story to admit of loaded teams, in consequence of which all material for use of workmen in the different departments has to be unloaded outside and taken in by hand. At present the basement story is occupied as a boat shop and by the necessary heave tools, planers, saws, etc. I have therefore to recommend, for convenience in removing large boats, admission of loaded teams, and additional light, now much needed, that a door be cut in each end of building, as shown on plan E in red dotted line.

Estimated cost.

Labor	$1,350
Material	650
Total	2,000

(9) *Schedule of tools and material required for construction plant under Bureau order.*

1 set plate straightening rolls, pulley driven, with friction clutches; 6 rolls, 12 inches diameter, 98 inches between housings. Estimated price complete and in position	$4,000.00
1 horizontal flange punch, 8-inch throat, capable of punching 1-inch steel plate or angle; to be pulley driven, pulleys 24 inches diameter, 6¼-inch face, speed 176 revolutions. Estimated cost complete and in position	825.00
1 horizontal flange punch, 42-inch throat, capable of punching ¾-inch steel plate; to be pulley driven, pulleys 24 inches diameter by 6¼-inch face, speed 176 revolutions. Estimated price complete and in position	1,400.00
1 double angle shear, capable of shearing angles 6 by 6, pulley driven, pulleys 24 inches diameter by 6¼-inch face, speed 230 revolutions. Estimated price complete and in position	1,000.00
2 No. 2 combined punch and shear complete, with electric motor for driving same equal to Hills & Jones Co., as per catalogue, page 22. Estimated price, each complete and ready for use, $1,250	2,500.00
1 electric dynamo and attachments complete, including switchboard, containing armature, voltmeter, and double-pole switch, slate mounted, machine to run 1,200 revolutions of the armature per minute, and develop an electro-motive force of 125 volts and a current of 200 amperes. Estimated cost, delivered at this station, set up, and run for approval	1,190.00
2 shunt-wound drill motors, capable of developing 4-horse power by brake, with a difference of potential of 100 volts, each motor to be provided with a strong oak base swivel truck and 100 feet of flexible wire connection. Estimated cost per motor, $750	1,500.00
100 50-candle-power Edison lamps of 100 volts; 200 20-candle-power Edison lamps of 100 volts; 100 pounds insulated wire. Estimated cost	320.00
1 20 horse-power portable engine and boiler, with frame-truck hoisting gear, belt pulley, and independent steam pump, boiler to be a vertical cylinder 42 inches in diameter, 8 feet high, containing 85 2-inch tubes 60 inches long; engine to be double-cylinder type, cylinder 7 inches diameter, stroke of piston 12 inches; must have power to lift a weight of 5,000 pounds, estimated total weight 6,000 pounds. Estimated cost	1,250.00
1 heavy pulley-block traveling crane, equal to the Yale & Towne, having a span of 26 feet, capable of transporting a weight of 10,000 pounds, to be provided with trolley, pulleys, and propelling gear complete. Estimated cost, ready for use	1,100.00
1 suspended rotary bridge crane, including suspended track connections, fitted with three arms, trolley and pulley to each, each arm, with its trolley, pulley, and connections, to be capable of lifting 6,000 pounds, length of arms 24 feet, to be equal to the Yale & Towne crane. Estimated cost, ready for use	1,200.00
2 No. 9 Stow portable drills and all attachments complete. Estimated cost each $220	440.00
2 No. 6 Stow portable drills and all attachments complete. Estimated cost each $157	314.00
2 cutting-off circular saws, 26 inches diameter, mandrel hole 1⅛ inches diameter, No. 7 gauge. Estimated cost each $12	24.00
1 circular saw, splitting, 26 inches diameter, mandrel hole 1⅛ inches diameter, No. 10 gauge. Estimated cost	12.00
1 cutting-off circular saw, 17 inches diameter, mandrel hole 1 inch diameter, No. 12 gauge. Estimated price	6.00
1 cutting-off circular saw, 12 inches diameter, mandrel hole 1 inch diameter, No. 15 gauge. Estimated price	3.00
1 circular saw, splitting, 17 inches diameter, mandrel hole 1 inch diameter, No. 12 gauge. Estimated cost	6.00
1 Hoe patent steel duplex swage for large circular saws. Estimated cost	350.00
1 No. 1 double-geared saw gummer for large circular saw. Estimated cost	20.00
1 automatic knife-grinding machine, to grind planer knives, 30 inches long. Estimated cost, ready for use	150.00
1 dozen steel boiler clamps, to open 4 inches from center of screw to run back 4½ inches. Estimated cost	48.00

1 box containing a set of Grant's No. 1 diestock, dies, taps, taper plug, and bottoming tap, $\frac{1}{4}$ to 12 inch. Estimated cost	$24.60
1 box containing a set of Grant's No. 2 diestock, dies, taps, taper plug, and bottoming tap, $\frac{5}{16}$ to $\frac{3}{4}$ inch. Estimated cost	37.00
1 box containing a set of Grant's No. 3 diestock, dies, taps, taper plug, and bottoming tap, $\frac{1}{2}$ to 1 inch. Estimated cost	45.00
1 box containing a set of Grant's No. 4 diestock, dies, taps, taper plug, and bottoming tap, 1 to $1\frac{1}{4}$ inches. Estimated cost	90.00

10. MORSE PATENT INCREASED TWIST DRILLS.

1 dozen $\frac{1}{4}$-inch	$7.20
1 dozen $\frac{5}{16}$-inch	7.80
1 dozen $\frac{3}{8}$-inch	9.60
1 dozen $\frac{7}{16}$-inch	10.80
1 dozen $\frac{1}{2}$-inch	12.00
1 dozen $\frac{9}{16}$-inch	14.40
1 dozen $\frac{5}{8}$-inch	16.80
1 dozen $\frac{11}{16}$-inch	19.20
1 dozen $\frac{3}{4}$-inch	22.20
1 dozen $\frac{13}{16}$-inch	25.80
1 dozen $\frac{7}{8}$-inch	29.40
1 dozen $\frac{15}{16}$-inch	33.00
1 dozen 1-inch	36.00
1 dozen $1\frac{1}{16}$ inch	40.80
1 dozen $1\frac{1}{8}$-inch	45.60
1 dozen $1\frac{3}{16}$-inch	50.40
1 dozen $1\frac{1}{4}$-inch	54.00
Estimated total cost	435.00

11. LEATHER BELTING.

70 feet 24-inch belting (leather link), at $6	$420.00
250 feet 24-inch belting (leather double), at $6	1,500.00
100 feet 9-inch belting (leather double), at $1.73	173.00
600 feet 6-inch belting (leather double), at $1.14	684.00
200 feet of $4\frac{1}{2}$-inch belting (leather double), at 84 cents	168.00
500 feet 4-inch belting (leather double), at 75 cents	375.00
300 feet of $3\frac{1}{2}$-inch (leather double), at 65 cents	195.00
250 feet 3-inch belting (leather single), at 36 cents	90.00
Estimated total cost	3,605.00

12. HYDRAULIC PLANT.

1 hydraulic ram accumulator pump and connections complete, ram 12 inches diameter, 16-inch stroke, and capable of exerting a pressure of 2,000 pounds per square inch. Estimated cost, complete and in running order.	$2,200.00

HYDRAULIC RIVETERS.

1 hydraulic riveter, capable of riveting plates 36 inches wide, and rivets 1 inch diameter. Estimated cost	$550.00
2 hydraulic riveters, capable of riveting plates 54 inches wide, and rivets 1 inch diameter. Estimated cost, each, $750	1,500.00

Recapitulation.

New buildings.	Labor.	Material.	Total.
Ship-fitters machine shop	$3,540.00	$2,214.00	$5,754.00
Plate rack and forge shed	12,707.00	5,429.00	18,136.00
Boiler and engine room, proposed additions to	3,520.00	1,448.21	4,968.21
Pickling tanks and connections	658.00	620.00	1,278.00
Boilers	1,625.00	250,00	1,275.00
Proposed door in end of building No. 36 (joiner shop)	1,350.00	650.00	2,000.00
Total cost	22,800.00	10,611.21	33,411.21

New tools.	Total cost.	New tools.	Total cost.
Plate straightening rolls	$4,000.00	1 duplex swage	$350.00
1 horizontal flange punch	825.00	1 double-geared saw gummer	20.00
1 horizontal flange punch	1,400.00	1 automatic knife grinder	150.00
Double angle shear	1,000.00	1 dozen boiler clamps	48.00
2 No. 2 combined punches and shears, at $1,250	2,500.00	1 box No. 1 taps and dies	24.60
1 electric dynamo	1,190.00	1 box No. 2 taps and dies	37.00
2 shunt wound-drill motors, at $750	1,500.00	1 box No. 3 taps and dies	45.00
300 Edison lamps and wire	320.00	1 box No. 4 taps and dies	90.00
1 portable engine and boiler	1,250.00	17 dozen Morse patent drills	435.00
1 heavy pulley-block traveling crane	1,100.00	Leather belting, 2,270 feet	3,605.00
1 suspended rotary bridge crane	1,200.00	Hydraulic plant	2,200.00
2 Stow portable drills, No. 9, at $220	440.00	1 hydraulic riveter	550.00
2 Stow portable drills, No. 6, at $157	314.00	2 hydraulic riveters, at $750	1,500.00
2 circular saws, 26-inch, at $12	24.00	Total new tools	26,144.60
1 circular saw, splitting, 26 inches	12.00	Total new buildings	33,411.21
1 circular saw, 17 inches	6.00		
1 circular saw, 12 inches	3.00	Grand total	59,555.81
1 circular saw, splitting, 17 inches	6.00		

Very respectfully,

WM. HICHBORN,
General Foreman in Charge Department Construction and Repair.

The COMMANDANT.

U. S. NAVY-YARD, PORTSMOUTH, N. H.,
July 13, 1894.

SIR: In compliance with Bureau's order of June 12, No. 7501-94, relative to the improvements, alterations, and additions to the construction plant of this yard, to enable the work to be performed more economically and promptly, I herewith submit the accompanying report.

Very respectfully,

JOHN B. HOOVER,
Naval Constructor, U. S. Navy.

The COMMANDANT.

U. S. NAVY-YARD, PORTSMOUTH, N. H.,
July 13, 1894.

Report submitted in compliance with the order of the Bureau of Construction and Repair of June 12, 1894, No. 7501-94, relative to the improvement, alteration, or addition to the construction plant of this yard, needed to enable work to be performed more promptly and economically, viz:

To be purchased: One Wells light and an apparatus complete for heating plate and angle furnaces.

The following to be completed: Plate and angle furnaces, slabs for bending platform, piping for six new boilers, and piping for heating ship-fitting shop in building Nos. 45 and 46.

To construct an overhead trolley in building Nos. 48 and 49.

The following improvements and alterations are also recommended: In building No. 14 (head house), occupied as joiner's shop, block shop, etc., it is recommended that the block shop, grindstone rooms, and the room for stowing lignum-vitæ be

removed from the basement of this building, and that doors be cut on each end of the building of sufficient size to admit the passage of a loaded team through them.

It is also recommended to change the position of the double-surface planer on this floor, which now sets at right angles to the main shaft, to a position parallel with the shaft, thus increasing its efficiency.

The only use now made of this planer is to plane deck plank and thick bulkhead material, it being so remote from the other tools, and also being in such close quarters. Whereas, if it could be so situated as to be used for all other planing, much time would be saved, as it would do at one operation what now requires a double passage through a single-surface planer.

I would also recommend that the main saw bench, and such other tools as there is room for, should be placed upon this floor, and the space now occupied by such tools be utilized by work benches.

By such an arrangement the cabinet shop could be removed from the illy adapted attic floor to the third story of this building, and the whole upper story be occupied as a varnish room and much-needed storeroom.

I would also recommend the fitting up of a drying room, which could be made at a comparatively small expense by adding another story to the boiler house connected with the joiner's shop, the roof of which could be raised intact, and the walls would need to be increased in height not more than 7 feet; nor would the danger of fire be materially increased, as the floor would be about the same distance from the boiler as the roof at present. An entrance to the room could be made from the corner window of the shop. A part of the second story of building Nos. 45 and 46 is recommended for use as a block shop.

The estimated cost for the foregoing is as follows, viz:

	Labor.	Material.	Total.
One Well's light No. 3, 200 candle power	.....	$112.00	$112.00
Apparatus for heating plate and angle furnaces	.....	3,400.00	3,400.00
Complete angle furnace	$300.00	.....	300.00
Complete plate furnace	150.00	.....	150.00
Complete bending slabs	2,900.00	900.00	3,800.00
Piping for 6 new boilers	80.00	20.00	100.00
Heating ship-fitting shop in Nos. 45 and 46	250.00	100.00	350.00
Overhead trolley in building Nos. 48 and 49	700.00	300.00	1,000.00
Changes in basement of building No. 14	650.00	.....	650.00
Fitting block shop in Nos. 45 and 46	175.00	.....	175.00
Changes recommended in upper stories of building No. 14	500.00	.....	500.00
Additional story on boiler house	500.00	250.00	750.00
Total	6,205.00	5,082.00	11,287.00

Very respectfully,

JOHN B. HOOVER,
Naval Constructor, U. S. Navy.

REPORT

OF THE

CHIEF OF THE BUREAU OF STEAM ENGINEERING.

NAVY DEPARTMENT,
BUREAU OF STEAM ENGINEERING,
Washington, D. C., September 29, 1894.

SIR: In obedience to your order of July 2, I have the honor to submit to the Department the annual report of this Bureau, together with estimates for the fiscal year ending June 30, 1896:

APPROPRIATION, STEAM MACHINERY, 1894.

Amount appropriated for fiscal year ending June 30, 1894; act approved March 3, 1893		$695,000.00
Amount appropriated to replace articles destroyed by fire at Norfolk navy-yard		40,000.00
Total		735,000.00
Labor in navy-yards and stations in repair of steam machinery, boilers, etc., of naval vessels fitting for sea service, and preservation of tools, handling and preservation of materials, stores, etc	$436,663.70	
Purchase of materials, stores, machine tools; freight and incidental expenses	190,957.75	
Payments for repairs, materials, freight, and incidental expenses on foreign stations	86,946.16	
Total	714,567.61	
Less repayments by transfers in the adjustment of appropriations	2,536.74	
Total expenditures		712,030.87
Balance on hand		22,969.13

The entire balance of $22,969.13 is required to pay bills for outstanding contracts and unfilled approved open purchase requisitions.

GENERAL OPERATIONS OF THE BUREAU.

The original machinery of the *Nina* having become entirely worn out in service, while the hull was still perfectly good, the Bureau constructed new machinery, of modern type, for her in the New York navy-yard, and this new machinery has lately been placed in the vessel. Reports from her state that her speed has been increased more than a knot, while as a tug she has greater power and handiness than before. Similar machinery has also been constructed for the *Leyden*, a sister ship, and is now in readiness for shipment to the Portsmouth, N. H., navy-yard to be placed in her.

Special appropriation having been made for new machinery for the *Fortune* and *Standish*, the work of constructing it is well under way in the Norfolk navy-yard, material on hand, as well as two boilers, being utilized as far as possible.

The drawings for the machinery for a tug for the Mare Island yard, for which special appropriation has also been made, are nearly completed, and the work of constructing it will be taken in hand at once.

The machinery for the *Cincinnati* and *Raleigh* has been completed, and both ships are now in commission. It is the unanimous opinion of all competent to judge who have seen it that in workmanship and finish it will compare favorably with similar machinery built at any establishment in the world, while its cost has been no greater than if obtained by contract, notwithstanding damage by fire to the amount of over $20,000, the large increase in cost of erecting it on the *Raleigh*, due to boxing and shipping it to Norfolk, and the great comparative expense of handling heavy parts in the navy-yard due to want of proper facilities. If to the actual cost we add the possible premiums for over power, its cost appears still more reasonable. More than three-fifths of the entire cost has been for labor, and this money has passed directly from the Government to the mechanic.

The machinery for the *Monadnock* is now near completion, and the vessel will soon be ready for her dock trial.

In all its designs for machinery, whether for a tug, a battle ship, or a cruiser, the Bureau has, in spite of much adverse criticism, insisted on a fair proportion of weight for power, especially in the boilers; as a consequence the Department has been spared the annoyance of failures on trial trips; and, without exception, all machinery built from its designs has done all, and more than all, that was required of it on the first trial, and without distress, accident, or injury of any kind. Such a record is unique, and, when the high powers and unprecedented speeds of some of the vessels are considered, it is one to be justly proud of.

In the opinion of the Bureau, much of this success is due to its uniform practice of allowing ample power for the speed required with a given displacement, as determined from the carefully observed performances of similar vessels, and to having every design, before final adoption, carefully scrutinized by an engineer officer who has performed service at sea in charge of machinery, this being the only way in which much of the information absolutely essential to the successful designing engineer can be obtained.

Congress having made special appropriation for the purpose of building new machinery for the *Chicago*, the Bureau has perfected plans for it, and the work of construction has been commenced in the New York navy-yard. In preparing these plans it has been the aim of the Bureau to design machinery that can be placed in the vessel without cutting or removing the protective deck or any of the principal framing, and also to utilize as much of the present machinery, in the way of shafting, pumps, blowers, etc., as possible, thereby greatly decreasing the cost of manufacture and installation.

The new engines will be slightly inclined, triple expansion, and designed for 9,000 I. H. P. About one-half the power is to be obtained from Scotch or cylindrical boilers, made single ended that they may be lowered through the present openings for uptakes, etc., and the other half from tubulous or pipe boilers.

The new machinery will weigh considerably less than the old, and the smaller space occupied by it will allow the coal capacity to be increased

›ns. The speed of the vessel will be increased three knots and the s of action about 22 per cent.

ɔ boilers of the *Alert* having become entirely worn out in service, removed from the vessel, and two boilers, originally intended for *Monadnock*, were placed in her instead. These latter boilers are of e and size that would not be constructed for a vessel of the *Alert* if new ones were to be built, being so great in diameter that they d away above the water line, but by using them time and con- able money were saved and the vessel enabled to carry much more than formerly, as well as be perfectly well adapted for such serv- s surveying or cruising in the Bering Sea; indeed, for this last ɔe, from her great coal capacity, she is better adapted than any l that was there during the last season, having kept the sea -seven days continuously, and this might have been increased if ı had been carried on one boiler only.

ecifications and the preliminary drawings were prepared for inery of 2,000 I. H. P., suitable for the *Hartford* in case Congress d determine to furnish that vessel with new engines.

o preliminary designs have been made for the machinery for tor -boat destroyers; one of these is for machinery of 6,000 I. H. P. the other for 4,500 I. H. P.

ecifications and plans are being prepared for the machinery for › torpedo boats. The engines will be vertical, twin screw, triple nsion, with four cylinders, and of 2,000 I. H. P. The engines will alanced by placing the cranks opposite and at right angles, and by ıng all the moving parts of each engine of the same weight. Each ne will be placed, with its auxiliaries, in a separate water-tight partment, one forward of the other; there will also be two boilers, orward and one aft of the engines, in separate compartments, thus nizing the chance of disabling the entire machinery by a single

chinery has been built for two third-class torpedo boats for the e and is now ready for erection in the boats. Similar machinery v in preparation for two torpedo boats for the *Texas*.

ıwings have been made for three new styles of steam-cutter es. These new engines will be of the same sizes as those now in ut will be cheaper to build, owing to the substitution of cast-iron s for wrought-iron ones.

igns have been prepared for machinery of 2,000 I. H. P. and of H. P. for the revenue marine.

PORTSMOUTH, N. H., NAVY-YARD.

e principal work in the steam engineering department of this yard ıg the last year has been the construction of machinery for steam rs, a class of work which may almost be said to have become a alty at this place.

e hard usage to which steam cutter machinery is subjected when rvice necessitates its being of the very best material and workman- conditions which can not always be assured unless constructed by overnment itself.

boiler shop is badly needed at this yard.

pairs have been made to the machinery of the following vessels, or s and outfits have been prepared for them: *Castine*, *Machias*, *n*, *Kearsarge*, and *Fern*.

›rk for other Bureaus has been as follows:

Equipment.—Cleaned boiler; ran dynamo; made brackets and outriggers.

Construction and Repair.—Fitted boat cradle; boiler-maker's and molder's work for *Machias.*

Yards and Docks.—Made castings for hydrants, sled shoes, gas retorts, and grate bars; repaired water tank, boilers, and gas holders.

Ordnance.—Made fuse tap.

Medicine and Surgery.—Work for hospital.

The amounts expended, other than for the machinery of naval vessels, were as follows:

Civil establishment	$1,800.00
Superintendence and care and repair of shop, machinery, and tools	15,969.39
Boilers and machinery for launches for general use	41,419.30
Labor and material for other departments	398.93
Breaking up and conversion of old material	3,397.46
Miscellaneous	2,547.88
Total	65,532.96

BOSTON NAVY-YARD.

Some of the largest and finest power tools in the country, including a boiler-making plant with hydraulic flanging and riveting machines, rolls of large size, punches, shears, hydraulic lifts, etc., are in the steam engineering shops at this yard. The tools themselves, in all the shops, are cared for and preserved from deterioration, but many of the buildings need considerable repairs and the foundations for some of the heavier tools need to be almost rebuilt.

It is recommended that this yard be again used as a repair station and the shops placed in running order. No better mechanics are to be found in the world than in its immediate vicinity, and no better work has ever been done for the Government than at this navy-yard.

Small repairs were made to the machinery of the following vessels: *Iwana*, *Rocket*, *Fern*, *Vesuvius*, and *Wabash.*

The expenditures, other than for the machinery of naval vessels, were as follows:

Office expenses	$214.00
Care and repair of shop machinery and tools	6,427.96
Running, firing, and repairing yard engines and boilers	261.12
Improvement of plant with new tools, etc	187.42
Care and repair of yard steam launches	61.36
Total	7,151.86

NAVAL STATION, NEWPORT, R. I.

The work at this station has been the care and repair of the machinery of the training ships and steam cutters, and the heating and pumping apparatus for water supply in the various buildings on shore.

The expenditures were as follows:

Care and repair of shop machinery and tools	$139.41
Repair of yard engines and boilers	224.30
Care and repair of yard steam launches	3,251.53
Miscellaneous	1,612.63
Total	5,227.87

NAVAL STATION, NEW LONDON, CONN.

Nothing has been done at this station except the care and preservation of material and steam-cutter machinery.

The expenditures were as follows:

Care and repair of yard steam launches	$448.83
Miscellaneous	782.50
Total	1,231.33

NEW YORK NAVY-YARD.

The shops in this yard, except the smithery, are well grouped together and have a central steam plant that will be ample for many years. The machine shop is well supplied with tools for any class of work it may be called on to do, and is of sufficient size for present and prospective needs.

The boiler shop is of but half the length designed, and should be at once extended to the size originally intended. The present erecting shop is merely a light corrugated iron building, too small for its intended purpose, and should be replaced by a larger and more substantial one.

A new smithery is urgently needed, as the present one, besides being too small, is also too far from the other shops, and transporting work to and from it causes delay in completion as well as increase in cost.

The railroad track in this yard is, in general, entirely too light, being mostly of ordinary street rails, so that when a boiler or other heavy weight has to be moved "skidding" has to be resorted to, which greatly increases cost as well as causes delay. As an example of the cost of "skidding," it can be stated that to move the *Cincinnati's* boilers from the shop to the ship by this method cost over $3,700, enough to have laid a substantial track the entire distance.

Repairs have been made to the machinery of the following ships, or stores and outfits have been prepared for them: *Alarm*, *Alliance*, *Atlanta*, *Baltimore*, *Bennington*, *Boston*, *Castine*, *Catalpa*, *Chicago*, *Cincinnati*, *Columbia*, *Cushing*, *Dolphin*, *Fern*, *Kearsarge*, *Lancaster*, *Leyden*, *Machias*, *Maine*, *Marblehead*, *Miantonomoh*, *Michigan*, *Monongahela*, *Nantucket*, *Narkeeta*, *New York*, *Nina*, *Philadelphia*, *Puritan*, *Raleigh*, *San Francisco*, *Terror*, *Texas*, *Traffic*, *Vermont*, *Vesuvius*, *Yorktown*, *Minnesota*, and *Portsmouth*.

The work done for other Bureaus was as follows:

Construction and Repair.—Made a number of iron and composition castings for various purposes; made tests of coal.

Equipment.—Made a large number of tests of coal and oil; made numbers of iron and composition castings; made various attachments for sounding machines and compasses; performed a considerable amount of coppersmith work for the galleys and piping of various vessels.

The tests of coal here mentioned consist in running a marine boiler for twenty-four consecutive hours, with the coal to be tested under as nearly as possible the conditions of actual service. The same boiler is used in all the experiments and the same firemen employed. The rate of combustion is 12 pounds of coal per square foot of grate per hour; all the water evaporated and coal burned is carefully weighed; steam is carried at a uniform pressure; ease or difficulty of firing with the coal under trial noted, as well as the character of the flame, smoke, and deposit. In short, a complete record is kept of everything that will enable a just estimate to be formed between the different coals.

Ordnance.—Made various castings; performed coppersmith work on air compressors and torpedo gear; repaired boiler.

Supplies and Accounts.—Repaired boiler; tested a large number of different kinds of oils.

Yards and Docks.—Made a number of castings; made repairs to engines and boilers; made smoke pipe.

The expenditures, other than for machinery of naval vessels, were as follows:

Civil establishment	$9,446.16
Office expenses	2,541.53
Care and handling of stores	7,217.69
Care and repair of shop machinery and tools	23,770.56
Overhauling machine tools after the fire	1,985.14
Running, firing, and repairing yard engines and boilers	3,171.67
Improvement of plant, new tools, etc	22,749.87
Repairs and maintenance of floating derrick	8,521.75
Care and repair of yard steam launches	11,220.75
Boilers and machinery of steam launches for issue	12,352.64
Labor and material for other departments	6,514.51
Experimental and test purposes	6,208.98
Making stores for issue	1,046.77
Breaking up old material	2,183.21
Shipments	852.12
Holidays	7,539.84
Total	127,323.19

LEAGUE ISLAND NAVY-YARD.

A large lathe, an open side planer, and a milling machine were purchased during the last year, from a special appropriation, and set up. These tools are of the latest design, are of great power, and will add largely to the efficiency of the machine shop. To put the yard in condition a boiler-making plant is needed, and estimates are submitted for one.

Too much can not be urged in favor of completing this yard in compliance with the recommendations in the very excellent report of the Board composed of Capts. Potter, Farquhar, and Whitehead, and Civil Engineers Endicott and Peary, U. S. Navy, who went over the whole matter exhaustively, and prepared plans which, if carried out, give the United States a naval station second to none in the world. The advantages of location and surroundings are too well known to need repetition; in short, there is every good reason why this should be the principal naval station for building, repairing, and laying up modern ships, and not one against it.

Repairs were made to the machinery of the following vessels, or stores and outfits prepared for them: *Nahant*, *Jason*, *Montauk*, *Richmond*, *Indiana*, *Massachusetts*, *Brooklyn*, *Minneapolis*, *Iowa*, and *Columbia*.

The necessary care has been taken of the power tools to preserve them from deterioration.

The expenditures during the year, other than for the machinery of naval vessels, were as follows:

Civil establishment	$1,200.00
Care and repair of shop machinery and tools	10,219.45
Improvement of plant, new tools, etc	16,675.09
Total	28,094.54

WASHINGTON NAVY-YARD.

airs were made to the machinery or steam plant of the ssels: *Cushing*, *Dale*, *Dolphin*, *Fern*, and *Triton*.
ditures during the year, other than for the machinery of ', were as follows:

.....	$56.38
ction Board for stores	612.00
r of shop machinery and tools	1,695.92
r of yard steam launches	7,646.24
.....	140.86
aratus at Bureau	930.24
e-General's office	254.28
.....	11,335.92

NAVAL ACADEMY.

ıve been made to the machinery of the vessels and steam hed to the Academy.
ditures during the year were as follows:

r of tools	$116.62
r of yard steam launches	70.18
.....	186.80

NORFOLK NAVY-YARD.

from its location and surroundings is well adapted for a epair station. The shops, particularly the machine shop, adapted for economical performance of work, owing to the e absence of facilities for handling heavy weights and the of fitting proper ones in some of the present buildings.
he yard in good condition for the building and repair of hinery a number of power tools, cranes, railroad tracks, uired, as well as a new building for the machine shop, ets for the workmen, etc.
ıve been made to the machinery of the following vessels, l outfits have been prepared for them: *Atlanta*, *Amphitrite*, *arleston*, *Concord*, *Constellation*, *Detroit*, *Essex*, *Franklin*, *Monongahela*, *Montgomery*, *Miantonomoh*, monitors at Rich- *rk*, *New York*, *Nantucket*, *Raleigh*, *Standish*, *Texas*, *Vesu- ta*, and *Wyandotte*.
ditures during the year, except for the machinery of naval as follows:

ment	$1,299.95
.....	1,057.73
.....	3,149.49
for Employment Board	61.94
ling of stores	5,077.72
ce	6,092.36
r of shop machinery and tools	22,143.14
g and repairing yard engines and boilers	7,065.44
r of yard steam launches	1,030.52
ıchinery of launches for issue	731.09
es for issue	320.80
and test purposes	249.24
ld material	304.64
.....	3,915.02
.....	114.60
.....	52,613.68

NAVAL STATION, PORT ROYAL, S. C.

No work was done at this station other than that necessary for the repair of steam-cutter machinery and preservation of tools.

The expenditures were as follows:

Care and repair of machine tools	$74.48
Care and repair of yard steam launches	1,044.38
Total	1,118.86

NAVAL STATION, KEY WEST, FLA.

In a wooden building, little better than a shed, at this station are a number of power tools and a small cupola. None of the tools are of large size and all of them are of old pattern, having been in their present location for many years. The shop is well cared for by one man, and the tools are always in condition for immediate use.

This shop, small and incomplete as it is, has oftentimes proved of almost inestimable benefit to vessels of the merchant marine as well as the Navy; for Key West being in the very gateway to the Gulf, it has often happened that vessels bound to or from the ports therein, and whose machinery required repairs beyond the facilities on board ship, have stopped and been enabled to make them with the aid of this Government shop—the only one in the place or the vicinity. This use of the shop costs the Government nothing, as the entire expense of running, when so used, is paid by the owner of the vessel; and the Government really benefits by having the power tools occasionally used, which is the surest way to keep them in good order.

As Key West is to be the principal coaling station for our vessels in the Gulf and West Indies, it is recommended that a more suitable building be erected and these tools, together with a few modern ones and a small steam hammer and furnace, be moved into it. The first cost will not be great and the maintenance no more than at present, and the possession of such a shop at this point may be the means of keeping a vessel on the station when her services are greatly needed, instead of sending her a long distance for repairs that can not be delayed.

The expenditures during the past year were as follows:

Superintendence	$1,566.00
Care and repair of shop tools	18.67
Total	1,584.67

PENSACOLA NAVY-YARD.

No work was done at this yard other than that necessary for the repair of steam cutters and the care and preservation of material.

The expenditures were as follows:

Civil establishment	$1,000.00
Office expenses	71.83
Care and handling of stores	405.68
Superintendence	1,228.00
Care and repair of shop, machinery, and tools	911.22
Running, firing and repairing yard engines and boilers	201.53
Care and repair of yard steam launches	566.39
Total	4,384.65

MARE ISLAND NAVY-YARD.

This being the only repair station on the Pacific coast, the necessities of the service render it essential that it should be always in efficient condition for the construction or repair of the machinery of naval vessels.

To place the yard in such condition an additional number of power tools are required and should be obtained at once.

The present coppersmith shop is a continuation of the boiler house; the forges are located in a small, low-roofed annex to the same building, and not only is the capacity of the shop entirely inadequate for the requirements of the yard, as proved by experience during the last year or more, but it is wretchedly ventilated, and the fumes from the acids sometimes become almost unbearable in consequence.

It is recommended that a new boundary wall be run the entire length of the main building and six feet outside of the present annex; this wall to be carried up to the height of the eaves and the ends joined with the main building; the roof to be finished off with a proper ventilator. This change will give, at small expense, a roomy and satisfactory coppersmith shop, and it is an improvement demanded by the necessities of the service due to the large amount of coppersmith work constantly required when making repairs to vessels or carrying on new work.

Repairs have been made to the machinery of the following vessels, or stores and outfits have been prepared for them: *Alert*, *Albatross*, *Bennington*, *Boston*, *Camanche*, *Hartford*, *Marion*, *Mohican*, *Monadnock*, *Monterey*, *Olympia*, *Philadelphia*, *Ranger*, *Thetis*, *Yorktown*, and *Nellie*.

The work done for other Bureaus has been as follows:

Equipment.—Made a number of iron and composition castings; repaired dynamo engine, galleys, etc.

Construction and Repair.—Made repairs to steam plant; tested boilers, etc.

Medicine and Surgery.—Made extensive repairs to steam plant at hospital.

Ordnance.—Made castings in iron and composition; repaired training engine, powder tanks, etc.

Yards and Docks.—Made a number of castings in iron and composition; made repairs to engines, boilers, etc.

The expenditures, other than for the machinery of naval vessels, were as follows:

Civil establishment	$1,400.00
Drafting	3,567.56
Office expenses	2,327.20
Care and handling of stores	4,042.70
Superintendence	11,411.71
Care and repair of shop, machinery, and tools	29,242.09
Running, firing and repairing yard engines and boilers	7,006.39
Care and repair of yard steam launches	1,005.32
Boilers and machinery for new launches	544.43
Labor and material for other departments	3,435.21
Experimental and test purposes	221.74
Making stores for issue	4,630.07
Breaking up old material	308.29
Holidays	3,883.22
Miscellaneous	2,284.04
Total	75,309.97

PUGET SOUND NAVAL STATION.

No work was done at this station other than that necessary for the preservation and repair of the machinery of the *Nipsic* and steam cutters.

The expenditures were as follows:

Yard expenses $6.65

USE OF BOILERS AS TRIMMING TANKS.

This Bureau would fail in its duty if it did not call attention to the injury done the boilers of vessels by using them for trimming tanks, particularly when salt water is run in for the purpose in boilers having steel tubes, and recommends that stringent orders be given to prevent it.

The cost of retubing a boiler is the least of the resulting evils; a much more serious one is that, if this practice is allowed to continue, the boilers of a vessel are liable to give out at any time and without warning. As an instance, it can be stated that on one of the newer vessels, where salt water was pumped in for this purpose, nearly all the boilers required retubing after less than three months' use, and if the Department had required her services for sudden and important duty she could not have performed it promptly.

DESTRUCTION OF COPPER PIPING.

The rapid destruction of copper piping in several vessels has already caused serious embarrassment, and the reason for this deterioration has not yet been determined to an absolute certainty. As it always happens that a copper pipe conveying or surrounded by salt water, as the injection or delivery pipe to a pump, or the coil of a fresh water distiller, is the part attacked, and as the deterioration occurs only in steel ships fitted with dynamos, it is thought the injury may be caused by electrolytic action, since the copper of which the pipes are made is known to be of the very best quality, absolutely free from foreign matter, and therefore not affected by the corrosive action of salt water; in fact, precisely similar pipes, made of the same material, in iron vessels like the *Alert* or *Ranger*, which have no dynamos, last almost indefinitely.

Steps are being taken to find out the true cause of this rapid destruction and the means by which it may be prevented.

PRESENT CONDITION OF THE MACHINERY OF NAVAL VESSELS, WITH THE WORK REQUIRED.

The following statement shows the condition of the machinery according to the latest reports, together with the work needed to fit the vessels for sea service or to keep them on duty or in readiness during the next fiscal year:

Adams (wooden cruiser).—Machinery and boilers in good condition. In commission.

Ajax (single-turret monitor).—In ordinary at Richmond, Va. Engines in fair condition. New boilers required for active service.

Alarm (torpedo ram).—In ordinary at Brooklyn navy-yard. Machinery and boilers in fair condition.

Alert (third-rate iron cruiser).—Main and auxiliary machinery in good condition. Vessel in commission.

Alliance (wooden cruiser).—Machinery and boilers in fair condition. Out of commission at navy-yard, Norfolk, Va. Machinery being thoroughly overhauled.

Amphitrite (double-turret monitor).—In ordinary at the Norfolk navy-yard. Machinery and boilers in good condition.

ita (second-rate steel cruiser).—In commission at Norfolk navy-yard. Being
vith new crank shaft.
more (second-rate steel cruiser).—Main and auxiliary machinery and boilers
l condition. In commission.
roft (Naval Academy practice vessel.)—Machinery and boilers in good condi-
In commission.
ington (steel gunboat).—Boilers and engines being overhauled, navy-yard,
sland. In commission.
on (second-rate steel cruiser).—Out of commission. Being overhauled at Mare
navy-yard.
anche (single-turret monitor).—In ordinary at Mare Island navy-yard. Machin-
d boilers in good condition and well cared for.
nicus (single-turret monitor).—In ordinary at Richmond, Va. Engines in
ndition, but new boilers would be required for active service. Time required
or temporary service, thirty days.
ine (steel gunboat).—Engines and boilers in good condition. Out of commis-
navy-yard, New York.
kill (single-turret monitor).—In ordinary at Richmond, Va. Engines in fair
ion, but new boilers will be needed for active service. Time required to fit
porary service, eight days.
leston (second-rate steel cruiser).—In commission. Machinery in good con-

ago (second-rate steel cruiser).—Engines in fair condition, but are much worn
need of overhauling. Boilers have been overhauled. Ship in commission.
innati (second-rate steel cruiser).—Engines and boilers in good condition. In
ssion.
mbia (first-rate steel cruiser).—Engines and boilers in good condition. In
ssion.
ord (steel gunboat).—Machinery and boilers in good condition. In commis-
Boilers have been retubed.
ing (torpedo boat).—Machinery and boilers in good condition. In commission.
oit (third-rate steel cruiser).—Machinery and boilers in good condition. In
ssion. Boilers have been retubed.
hia (dispatch vessel).—Condition of machinery, good. Boilers have been
d. Vessel in commission.
rald (tug).—Machinery and boilers in good condition. Yard ferry boat at the
outh navy-yard, New Hampshire.
rprise (wooden cruiser).—Detailed as school-ship for Massachusetts, and sta-
at Boston. Engines and boilers in fair condition for service.
r (wooden cruiser).—Machinery and boilers need repairs and overhauling.
ng ship, Newport, R. I.
(transport).—Engines and boilers are old, much worn, and only fairly efficient.
une (tug).—Transferred to Bureau of Ordnance for use at Newport, R. I.
ngines and boilers to be fitted.
klin (wooden frigate.)—Engines well cared for but of obsolete type. Boilers
ined. Employed as receiving ship at Norfolk navy-yard.
lford (wooden cruiser.)—In ordinary at Mare Island navy-yard. Machinery
oilers obsolete and unfit for use.
nois (wooden cruiser).—Machinery and boilers in poor condition, worn out, and
te. Hospital ship at Port Orchard, Puget Sound.
ua (tug).—Machinery and boilers in good condition. Yard tug at Boston.
n (single-turret monitor).—In ordinary at League Island navy-yard. Main
xiliary machinery in fair condition. Boilers in need of extensive repairs.
to fit for temporary service, fifteen days.
caster (wooden cruiser).—Boilers and engines in fair condition, but of anti-
l type. Being overhauled at navy-yard, New York Out of commission.
gh (single-turret monitor).—In ordinary at Richmond, Va. Engines and boilers
d condition. Time required to fit for temporary service, ten days.
en (tug).—New machinery being put in at Portsmouth, N. H., navy-yard.
tias (steel gunboat).—Engines and boilers in good condition. Went in com-
n September 18, at navy-yard, New York.
pac (single-turret monitor).—In ordinary at Richmond, Va. Engines require
al overhauling. Boilers unreliable. Time to fit for service, thirty days.
attan (single-turret monitor).—In ordinary at Richmond, Va. Engines in good
on, but the boilers are poor and need to be replaced before going into service.
days required to fit for temporary service.
lehead (third-rate steel cruiser).—Engines and boilers in good condition. In
ssion.
on (wooden cruiser).—Out of commission. Being overhauled at Mare Island.
onomoh (double-turret monitor).—Engines, main and auxiliary, and boilers
condition. In commission.

Michigan (paddle steamer).—In commission. Engines and boilers in good condition.

Minnesota (wooden frigate).—Receiving ship for boys at New York. Main engines in fair condition, but of obsolete type. The old boilers, still on board, are used for water tanks. New boilers for heating ship are in good condition.

Mohican (wooden cruiser).—Engines and boilers in good condition. In commission.

Monadnock (double-turret monitor).—Under construction at Mare Island navy-yard. Engines and boilers nearing completion.

Monocacy (iron, paddle wheel).—Engines, boilers, and their details in fair condition. In commission.

Montauk (single-turret monitor).—In ordinary at League Island navy-yard. Machinery, main and auxiliary, and boilers in fair condition. Seven days required to fit for temporary service.

Monterey (coast-defense vessel).—Engine department in good condition. In commission.

Montgomery (third-rate steel cruiser).—Port H. P. engine to be repaired. In commission.

Nahant (single-turret monitor).—In ordinary at League Island navy-yard. Machinery in fair condition. Boilers poor. Time required to fit for temporary service, fourteen days.

Nantucket (single-turret monitor).—Turned over to naval militia of North Carolina. Machinery in condition for temporary service.

Narkeeta (tug).—Boilers and engines in good condition. Yard tug at the New York navy-yard.

Newark (second-rate steel cruiser).—Machinery and boilers in good condition. In commission.

New York (first-rate steel cruiser).—Machinery and boilers in good condition. In commission.

Nina (tug).—Yard tug at New York navy-yard. New machinery completed and placed on board.

Nipsic (wooden cruiser).—Engines and boilers worn out and unfit for further service. Guard ship at Port Orchard, Puget Sound.

Omaha (wooden cruiser).—In ordinary at Mare Island navy-yard. Machinery obsolete. Boilers worn out.

Passaic (single-turret monitor).—In ordinary at the Boston navy-yard. Machinery and boilers in fair condition.

Pensacola (wooden frigate).—In ordinary at navy yard, Mare Island. Engines and boilers obselete, but in fair condition.

Petrel (steel gunboat).—Engines in fair condition. Condenser needs retubing. Boilers require constant attention. In commission.

Philadelphia (second-rate steel cruiser).—Ship in commission. Being overhauled at Mare Island navy-yard.

Pinta (armed tug).—Machinery and boilers in fair condition. In commission.

Puritan (double-turret monitor).—In ordinary at the Brooklyn navy-yard. Engines and boilers in good condition.

Raleigh (second-rate steel cruiser).—Engines and boilers in good condition. In commission.

Ranger (third-rate iron cruiser).—Engines and boilers in good condition. Vessel in commission.

Richmond (wooden cruiser).—Machinery well cared for and boilers in fair condition. Employed as receiving ship at League Island, Pennsylvania.

San Francisco (second-rate steel cruiser).—Ship in commission. Boilers retubed and machinery overhauled at navy-yard, New York.

Standish (Naval Academy target-practice boat).—New engine and boilers to be installed at navy-yard, Norfolk, Va.

Swatara (wooden cruiser).—In ordinary at Mare Island navy-yard. Engines and boilers in fair condition. New crank shaft required.

Terror (double-turret monitor).—In ordinary at Brooklyn navy-yard. Machinery and boilers in good order.

Thetis (special-service vessel).—Has been overhauled at Mare Island navy-yard. In commission.

Triton (tug).—Machinery and boilers in fair condition. Yard tug at Washington.

Vesuvius (dynamite-gun vessel).—Machinery and boilers in fair condition. In commission.

Wabash (wooden frigate).—Machinery obsolete, worn out, and condemned. Used as receiving ship at the Boston navy-yard.

Wahneta (tug).—Boilers and machinery in good condition. Yard tug at Norfolk.

Wyandotte (single-turret monitor.)—In ordinary at Richmond, Va. Engines and boilers in fair condition.

ntic (wooden gunboat).—Machinery and boilers in fair condition, but of obso-
ype. In commission.
rktown (steel gunboat).—Engines and boilers in good condition. In commission.

of work done under cognizance of the Bureau of Steam Engineering for the fiscal r ending June 30, 1894, upon machinery, boilers, etc., with outfits, stores, etc., of al vessels.

es of ves sels.	Machinery, boilers, etc.	Outfits, stores, etc.	Total.	Names of vessels.	Machinery, boilers, etc.	Outfits, stores, etc.	Total.
s		$185 25	$185.25	Miantonomoh	$1,249.11	$555.33	$1,804.44
and moni				Michigan	710.59	272.38	982.97
	$51 75		51.75	Minneapolis	2,797.86		2,797.86
	773 56		773.56	Minnesota		21.65	21.65
ross	729 82		729.82	Mohican	6,825.16	152.75	6,977.91
	29,787 42	1,661 99	31,449.41	Monadnock	92,084.95	1,474.61	93,559.56
ice	304.94	2,893 55	3,198.49	Montgomery	3,400.11	491.42	3,891.53
itrite	32,964 90	86 88	33,051.78	Monocacy	141.12	1,000.93	1,142.05
ta	35,211.47	2,975 15	38,186.62	Monongahela	5,462.51	23.75	5,486.26
nore	18,165.67	5,120.26	23,285.93	Montauk	778.28		778.28
ngton	5,943.39	6,279 61	12,223 00	Monterey	4,410.09	77.35	4,487.44
a	27,977.89	415 03	28,392.92	Nahant	849.86		849.86
lyn*	683.50		683.50	Narkeota	2,819.10	108.83	2,927.93
uche	1.00		1.00	Nantucket	404.70		404.70
ie	4,348.99	174.27	4,523.26	Nellie	433.74		433.74
ba	241.49		241.49	Newark	8,261.25	9,233.52	17,494.77
aston	954.36	8,205.93	9,160 29	New York	3,139.34	15,370.29	18,509.63
go	21,239.51	11,567.19	32,806.70	Nina	31,573.69	54.27	31,627.96
nnati	177,031.51	3,576.53	180,608.04	Nipsic	52.57	70.93	123.50
ibia*	1,619.41	1,056.31	2,675.72	Olympia*	138.74		138.74
rd	2,316 83	6 142.76	8,459.59	Oregon*	1,475.72		1,475.72
ellation	1,399.92	2 80	1,402.72	Passaic	799.12		799.12
ng	2,595 48	21 84	2,617.32	Petrel	874.58	1,338.76	2,213.34
	88.78		88.78	Philadelphia	283.21	4,485.51	4,768.72
it	5,909.76	3,131.27	9,041.03	Pinta	311.89		311.89
in	7,554 93	406.42	7,961.35	Portsmouth	421.68		421.68
	6,563 37	887.77	7,451.14	Puritan	18,936.83	243.13	19,179.96
	3,912.44	116.41	4,028 85	Raleigh	135,618.67	595.19	136,213.86
din	2,313.75	32.20	2,345 95	Ranger	3,337.85	1,019.36	4,357.21
oat No. 7*	2,304.67		2,304.67	Richmond	2.25	1,072.90	1,075.15
oat No. 8*	1,020.08		1,020.08	Rocket	370.77		370.77
oat No. 9*	1,020.08		1,020.08	San Francisco	7,287.54	2,460.10	9,747.64
ord	79.12		79.12	Standish	923.33		923.33
na*	2,825.48		2,825.48	Terror	16,223.60	710.43	16,934.03
	655.16		655.16	Texas	6,569.92	650.92	7,220.84
	870.64		870.64	Thetis	1,753.68	373.85	2,127.53
	644.42		644.42	Traffic	350.68		350.68
idin*	1,020.38		1,020.38	Triton	416.55	750.51	1,167.06
arge	779.92	101.42	881.34	Vermont	2,902.84	443.77	3,346.61
ster	210.03	3,866.50	4,076.53	Vesuvius	1,937.87	931.23	2,869.10
n	22,224.73		22,224.73	Wabash	457.24		457.24
as	4,376.49	920.91	5,297.40	Wahneta	1,001.82	75.96	1,077.78
	1,868.80	24,452.64	26,321.44	Wyandotte	45.60		45.60
ehead	3,295.57	2,041.47	5,337.04	Yantic	41.42	1,099.94	1,141.36
n	626.53	344.60	971.13	Yorktown	5,493.94	5,388.24	10,882.18
chusetts*	2,106.20		2,106.20				
ower	39.10		39.10	Aggregates	810,024.61	137,214.77	947,239.38

* Draftsmen and writers.

MACHINERY UNDER CONSTRUCTION FOR NEW VESSELS.

ie state of work on the machinery of the vessels reported upon in ast annual report is as follows:

ine.—Machinery completed and ready for trial. The following changes in the inery specifications have been made: Steering wheels changed from after superture to top of pilot house upon the request of the Bureau of Construction and ir. Ordinary grate bars substituted for shaking ones. Shells and heads of lers of cast iron instead of composition.

as.—Practically completed; awaiting fitting of armor in order to have official A successful dock trial was made on the 12th and 15th of May.

e following changes have been made in the machinery specifications: Auxiliary enser fitted. Change in dynamo piping. New design of turning engine with er power. Shells and heads of distillers of cast iron instead of composition.

Indiana.—Practically completed. A successful preliminary trial has been made; official trial delayed on account of armor not being in place.

The following changes in machinery proposed by contractors have been made: Steam instead of hand pump for oil tanks, and change in size and location of feeding tanks. Bell pulls and gongs substituted for speaking tubes from fire rooms to top of ash hoists.

The following change was ordered by the Bureau: Shells and heads of distillers of cast iron instead of composition.

Massachusetts.—In the same condition as the *Indiana*. The same changes have also been made in the machinery.

Oregon.—Practically completed, except the turret operating machinery. A successful preliminary trial was made in San Francisco Bay during the month of August.

The following changes have been made in the machinery specifications: Capacity of hydraulic pumping plant increased. Bell pulls on after bridge connected with gongs in engine rooms. Shells and heads of distillers of cast iron instead of composition.

Brooklyn.—The engines are being erected in the shop, and work on the boilers and pipes is well advanced.

The following changes, proposed by the contractors, have been approved: Boiler manhole plates of cast steel, dome-shaped, instead of forged steel. Boiler tubes of charcoal iron instead of steel, and change in method of setting.

The following change was ordered by the Bureau: Shells and heads of distillers of cast iron instead of composition.

Iowa (seagoing battleship No. 1).—Nearly all of the material for the machinery of this vessel has been received, and work on it is well advanced.

The following changes, proposed by the contractors, have been approved: Boiler manhole plates of cast steel, dome-shaped, instead of forged steel. Horseshoe thrust instead of solid block. Cross heads of I. P. and L. P. valve gear of manganese bronze instead of cast steel. Drains from valve chests to fresh-water side of condenser instead of to feed tank. Charcoal iron instead of steel boiler tubes, and change in the method of setting them.

The following change was ordered by the Bureau: Shells and heads of distillers to be made of cast iron instead of composition.

Olympia.—Has had a very successful trial and is ready for delivery to the Government, so far as her machinery is concerned.

The following changes have been made in the machinery specifications: Fixed covers for smoke pipes omitted, and canvas ones substituted. Additional gong from after bridge to engine room. Shells and heads of condensers of cast iron instead of composition.

Cincinnati.—Machinery has been completed and vessel given a satisfactory preliminary trial; in commission.

Raleigh.—In same condition as *Cincinnati*.

Montgomery.—Machinery completed and successfully tried. Vessel delivered to the Government and now in commission.

Marblehead.—Machinery completed and successfully tried. Vessel delivered to the Government and now in commission.

Columbia.—Completed and successfully tried. Delivered to the Government and now in commission.

Minneapolis.—Machinery completed and successfully tried.

The following changes in the machinery specifications have been made: Additional radiators fitted on account of extension of superstructure. Shells and heads of distillers made of cast iron instead of composition. Fixed covers for smoke pipes omitted.

Ericsson.—Machinery completed and ready for trial.

Katahdin.—The machinery of this vessel is nearly all in place on board and will soon be given a dock trial.

The following changes in the machinery specifications have been made: Grate bars of cast instead of wrought iron. Shells and heads of distillers of cast iron instead of composition.

Monadnock.—The greater part of the machinery of this vessel is in place on board. Steam has been raised in the boilers for test purposes, and the machinery will soon be ready for a dock trial.

The condition of work on the machinery of the vessels contracted for during the past year is as follows:

Gunboat No. 7.—Satisfactory progress has been made with the detail drawings; much of the material has been received, and work on it is progressing satisfactorily.

The following changes have been made in the machinery specifications: Shells and heads of distillers of cast iron instead of composition. Change in method of setting the tubes of the auxiliary boilers.

unboats Nos. 8 and 9.—Machinery practically in same condition as that of Gun-
it No. 7.
The following changes have been made in the machinery specifications: Diameter
boilers increased 3 inches. Shells and heads of distillers of cast iron instead of
nposition. Change in method of setting boiler tubes.

CONTRACT TRIALS OF NEW VESSELS.

Since my last annual report, five new vessels have successfully com-
leted their contract trials, and three their dock trials.

The *Marblehead* and the *Montgomery* were tried over a measured
course in Long Island Sound; the *Olympia*, over a similar course in
Santa Barbara Channel, and the *Columbia* and the *Minneapolis* off the
coast of New England, over a measured course between Cape Ann and
Cape Porpoise.

While all of these vessels made very successful trials, the greatest
nterest centered in the *Columbia* and the *Minneapolis*, from the fact
hat they were the first ships of any country propelled by triple screws,
which a requirement of more than 20 knots an hour was stipulated,
id from the fact that the maximum power for which they were designed
as greater than that of any war ship afloat or projected at the time,
d greater than that of any transatlantic steamer then in service.
e fitting of triple screws in these two vessels was brought about by
e peculiar conditions of the design of the ship—to be of moderate
nensions, with large coal capacity and exceptional power in order to
ch a maximum speed of 22 knots.

At the time the design was made, there was nothing of an experi-
ntal character, except on a very small scale, to indicate the relative
ciency of propulsion by two and three screws, but the generally
ognized opinion was that three screws would be less efficient than
o; and working on this theory greater power was given these ships
an was found to be necessary for the designed speed, with the result
at the *Columbia* and the *Minneapolis* stand unrivaled and unap-
ached in point of speed by any naval vessel afloat, except those of
e torpedo boat class. Although the design was looked upon by
ny as too big an experiment to make, the success of it has fully
dicated the judgment of the Bureau, and paved the way to greater
eed in transatlantic steamers; for I am convinced that if the ideal
e-day steamer becomes a reality, she will be one with triple screws,
d that it is in this direction we must proceed if we expect to make
increase in the speed of large cruisers.

After the completion of the official contract trial of the *Minneapolis*,
attempt was made during the return of the ship to Philadelphia to
ake trials with one, two, and three screws, in order to determine
proximately the relative economy of propulsion at a given speed;
t owing to weather conditions, which necessitated slowing and
pping of the engines, and the fact that the speed had to be measured
patent log, the results could not be accepted as at all near what
ght be expected in service; so the only way in which the most
onomical method of propulsion at cruising speed can be obtained is
m actual trial of these ships in service; but it is probable that for
eeds of 12 knots and more, two screws will be more economical than
e.

While the extraordinary speed of the *Minneapolis* and the *Columbia*
as, in a measure, overshadowed the results obtained by the other
essels, all of them have been remarkably successful, and the *Olympia*
pecially so, her speed of 21.686 knots for four consecutive hours

being remarkable for a vessel of her size, when her fighting qualities and her endurance are considered.

In the *Minneapolis*, the *Columbia*, the *Olympia*, and the *New York* we have produced a quartette of cruisers which, in point of speed, is unequaled by a like number of ships of any navy in the world. Their trials were most exhaustive, and the results such as to leave absolutely no doubt as to the real speed. Subsequent examination of the machinery failed to disclose any weakness or defect of any nature whatever in the machinery.

The machinery for the *Texas* having been so far completed as to permit of trial, and the final completion of the ship being so remote as to cause embarrassment to the contractors if the trial of the machinery should be delayed until after the completion of the ship, a dock trial was made at the Norfolk navy-yard to determine whether the machinery was well built and strong enough to withstand the strains which would be put upon it during the official trial prescribed by the contract. The requirements were that each main engine should be run separately for four hours in conjunction with one-half the boilers, that the full boiler pressure should be maintained, and that the average mean effective pressure in the cylinders should be equivalent to 37 pounds when reduced to the low-pressure cylinder. The trials were successful.

The machinery of the *Cincinnati* and the *Raleigh* having been built and erected in the navy-yard, these vessels were put in commission before the machinery was tried. Since going into commission both have had satisfactory dock trials, and have had preliminary trials in free route which indicate that they will prove to be two of the fastest vessels of their class afloat.

The torpedo boat *Ericsson* has steamed from Dubuque, Iowa, to New London, Conn., where she is undergoing preliminary trials preparatory to her official trial in Long Island Sound. The results thus far obtained indicate that she will make about 25 knots an hour.

The armored cruiser *Maine*, whose dock trials were recorded in my last annual report, is about ready for her official trial.

The detailed results of the trials of the vessels herein mentioned are given in the following tables:

Full power forced draft contract

1	Name of vessel		MARBLEHEAD		OLYMPIA	
2	Date of trial		December 7, 1893		December 15, 1893	
3	Duration of trial		4 hours		4 hours	
4	Place of trial		Long Island Sound		Santa Barbara Channel	
5	Condition of sea and weather		Smooth; light breeze		Smooth; light breeze	
6	Length on water line, feet		257		340	
7	Beam, feet		37		53	
8	Draught, mean, on trial, feet		14.4		20.73	
9	Displacement, tons		2,054		5,586	
10	Immersed midship section, square feet		464		970	
11	Coefficient of fineness, prismatic		.525		.517	
12	Type of engines		Vertical triple expansion		Vertical triple expansion	
13	Cylinder, diameters in inches.	High pressure	28.5		42	
14		Int. pressure	39		59	
15		Low pressure	63		92	
16	Stroke of pistons, inches		26		42	
17	Number and type of boilers		3 double ended; 2 single ended.		4 double ended; 2 single ended.	
18	Length and diameter of boilers, feet		2 D. E., 18.08 by 11.67; 1 D. E., 18.7 by 11.67; 2 S. E., 9.04 by 11.67.		D. E., 21.25 by 15.25; S. E., 10.96 by 15.25.	
19	Furnaces, number and diameter		13; 42″		40; 41″	
20	Grate surface used on trial, square feet		414.17		824	
21	Heating surface used on trial, square feet		11,058		28,298	
22	Condensing surface used on trial, square feet		7,934		19,900	
23	Screw propeller.	Diameter, feet	11		14.75	
24		Pitch, mean, feet	12		19	
25		Pitch, mean, adjustable between, feet.	11 and 14		18.5 and 19.5	
26		Area, developed, both screws, feet.	66.66		136	
27		Number of blades	3		3	
28	Steam pressure in pounds.	In boilers, per gauge	164.5		166.5	
			Starboard.	Port.	Starboard.	Port.
29		At engines, per gauge	163.7	160	163.7	164.8
30		In first receiver, absolute	77.6	85.1	92.82	95.60
31		In second receiver, absolute	30.9	33.5	31.11	33.53
32	Vacuum in condensers, in inches of mercury.		26.2	25.9	24.94	25.25
33	Revolutions of main engines per minute.		178.98	173.38	139.98	138.53
34	Mean pressures, in pounds per square inch.	High pressure	61.89	61.04	49.63	47.65
35		Int. pressure	31.60	32.11	38.51	40.05
36		Low pressure	13.46	14.59	16.27	17.8
37		Equivalent on low pressure.	36.37	37.40	42.45	44.18
38	Indicated horse power.	High pressure	789.48	754.05	2,001	1,903.2
39		Intermediate pressure	882.27	866.90	3,097.3	3,185.6
40		Low pressure	983.75	1,025.90	3,198.5	3,463.4
41		Aggregate each main engine.	2,655.86	2,646.79	8,297.6	8,552.2
42		Aggregate both main engines.	5,302.65		16,849.8	
43		Air-pump engines	15.65	15.95	18.22	35.78
44		Circulating pump engines	9.95	10.51	63.50	65.20
45		Feed pumps	22.10		94.7	
46		Blowers	54.20		130.56	
47		Other auxiliaries	19.67		102.32	
48		Aggregate, mean, of all machinery.	5,450.65*		17,363.08	
49	Speed per hour in knots		18.44		21.686	
50	Slip of propeller (mean), per cent		12.08		16.87	
51	Indicated thrust (main engines only) per square foot of developed area of propeller, in pounds.		1,234.7	1,268.8	1,514	1,576.8
52	I. H. P. per square foot of grate, based on mean I. H. P.		13.16		21.01	
53	Heating surface per I. H. P., based on mean I. H. P.		2.028		1.634	
54	Condensing surface per I. H. P., based on mean I. H. P.		1.455		1.148	
55	Weight of propelling machinery (including water), tons.		473.23		1,215.23	
56	I. H. P. per ton of machinery (mean I. H. P.).		11.205		14.247	
57	Coal	Kind and quality used	Pocahontas; hand picked		Welsh; Harris' navigation.	
58		Total burned per hour, pounds	15,690		37,937.5	
59		Per hour, per square foot of grate, pounds.	37.88		44.7	
60		Per hour, per I. H. P., pounds	2.88		2.19	

* Uncorrected.

trials of naval vessels.

MINNEAPOLIS			COLUMBIA			MONTGOMERY			1
July 14, 1893			November 18, 1893			January 19, 1894			2
4 hours			4 hours			4 hours			3
Off New England coast			Off New England coast			Long Island Sound			4
Smooth; light breeze			Smooth; light breeze			Smooth; light breeze			5
411.6			411.6			257			6
58.19			58.19			37			7
22.5			22.4			14.52			8
7,387			7,350			2,091			9
1,126			1,120			471			10
.481			.481			.526			11
Vertical triple expansion			Vertical triple expansion			Vertical triple expansion			12
42			42			26.5			13
59			59			39			14
92			92			63			15
42			42			26			16
8 double ended; 2 single ended.			8 double ended; 2 single ended.			3 double ended; 2 single ended.			17
6 D. E., 20 by 15.75; 2 D. E., 18 by 15.25; 2 S. E., 8.5 by 10.15.			6 D. E., 18 by 15.75; 2 D. E., 18 by 15.25; 2 S. E., 8.5 by 10.15.			2 D. E., 18.08 by 11.67; 1 D. E., 18.7 by 11.67; 2 S. E., 9.04 by 11.67.			18
64; 41″. 4; 35″			64; 41″. 4; 35″			16; 42″			19
1,456			1,404			400			20
48,194			45,226			10,978			21
29,782			30,467			7,652			22
Starboard.	Center.	Port.	Starboard.	Center.	Port.				
15	14	15	15	14	15	11			23
22	21.5	22	21.5	21.5	21.5	12.75			24
	19.5 and 22			19.5 and 21.5		12 and 15			25
53.7	53.28	53.7	53.7	53.28	53.7	58			26
3	3	3	3	3	3	3			27
	150.3			147.2		165.4			28
						Starboard.	Port.		
150.7	148.1	149	145	144	145.4	161.6	159.5		29
74.8	72.5	72.9	75	63.5	62	80.9	81.6		30
26.3	24.6	27.4	29.2	22.7	25.4	31.05	28.6		31
25.11	25.31	24.76	25.1	25	25.6	26.1	25.75		32
131.95	132.19	133.1	134	127.68	132.9	179.69	180.85		33
49.32	51.91	46.39	55.63	56.25	51.57	58.03	54.98		34
34.53	31.20	28.52	29.54	25.19	26	32.40	33.94		35
13.33	15.04	13.90	14.73	11.55	12.60	15.195	14.315		36
35.54	38.87	35.09	35.09	32.48	29.78	37.71	36.88		37
1,876.36	1,978.92	1,779.93	1,922.17	1,747.34	1,724.84	742.95	708.95		38
2,239.48	2,370.87	2,181.18	2,159.07	1,770.56	1,861.18	906.59	955.60		39
2,470.88	2,869.03	2,599.58	2,524.60	2,307.70	1,973.65	1,113.79	1,056.34		40
6,586.72	7,218.82	6,560.69	6,605.84	5,825.60	5,559.67	2,763.33	2,720.89		41
	20,366.23			17,991.11		5,484.22			42
10.91	8.39	13.87	16.299	17.973	22.170	18.82	15		43
18	18.45	17.56	14.073	6.997	8.674	4.58	4.32		44
	90.94			91.38		16.84			45
	263.04			166.304		27.44			46
	54.91			74.262		8.79			47
	20,862.30			18,409.242		5,580			48
	23.073			22.81		19.056			49
19.38	17.05	20.80	19.82	15.85	19.13	15.9			50
1,394.4	1,573.3	1,378	1,409	1,314.40	1,195.7	1,372	1,342		51
	14.29			13.15		13.95			52
	2.315			2.44		1.967			53
	1.431			1.645		1.371			54
	1 961.8			1,934.04		462.92			55
	10.61			9.57		12.054			56
Pocahontas; hand picked			Pocahontas; hand picked			Pocahontas; hand picked			57
No record			39,979			No record			58
No record			26.21			No record			59
No record			2.17			No record			60

Dock trial of the machinery of the Texas.

Cylinder diameters in inches .. High pressure	36	
Cylinder diameters in inches .. Intermediate pressure	51	
Cylinder diameters in inches .. Low pressure	78	
Stroke of pistons ... inches	39	
Boilers .. Type	Cylindrical; double-ended.	
Boilers .. Number	4	
Boilers .. Length and diameter ... feet	18 by 14	
Furnaces .. Number	24	
Furnaces .. Diameter ... inches	39	
Furnaces .. Grate surface ... square feet	533	
Furnaces .. Heating surface ... do	16,913	
Screw propellers .. Diameter ... feet	14.5	
Screw propellers .. Pitch, mean ... do	17.33	
Screw propellers .. Developed area of each ... square feet	66	
Screw propellers .. Number of blades	4	
Place of trial	Norfolk navy-yard.	
	Starboard.	Port.
Date of trial	May 12, 1894.	May 15, 1894.
Grate surface in use ... square feet	266.5	266.5
Heating surface in use ... do	8,456	8,456
Condensing surface in use ... do	6,462	6,462
Duration of trial ... hours	4	4
Air pressure in inches of water	1.2	0.95
Steam pressure .. In boilers, per gauge ... pounds	152.5	149.9
Steam pressure .. At engine, per gauge ... do	148.1	145.0
Steam pressure .. In first receiver, absolute ... do	82.9	74.0
Steam pressure .. In second receiver, absolute ... do	27.7	32.5
Vacuum in condenser in inches of mercury	21.2	21.2
Revolutions per minute	85.8	88.1
Mean effective pressure in cylinders .. High pressure ... pounds	46.98	48.96
Mean effective pressure in cylinders .. Intermediate pressure ... do	33.26	26.66
Mean effective pressure in cylinders .. Low pressure ... do	18.25	19.35
Mean effective pressure in cylinders .. Equivalent upon low pressure, pounds	42.25	40.93
Indicated horse power .. High pressure	794.69	847.95
Indicated horse power .. Intermediate pressure	1,137.06	926.89
Indicated horse power .. Low pressure	1,468.40	1,595.59
Indicated horse power .. Aggregate for main engine	3,400.15	3,370.43
Indicated horse power .. Air and circulating pumps	60.53	58.19
Indicated horse power .. Total	3,460.68	3,428.62
Indicated horse power .. Per square foot of grate	12.98	12.86

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Steam Engineering, Navy Department.

Detailed objects of expenditures and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
STEAM MACHINERY.			
For completion, repairs, and preservation of machinery and boilers of naval vessels, including cost of new boilers, distilling, refrigerating, and auxiliary machinery, preservation of, and small repairs to machinery and boilers in vessels in ordinary, receiving and training vessels, repair and care of machinery of yard tugs and launches	$425,000		
For purchase, handling, and preservation of all material and stores, purchase, fitting, repair, and preservation of machinery and tools in navy-yards and stations, and running yard engines	315,000		
For incidental expenses for naval vessels, yards, and the Bureau, such as foreign postage, telegrams, advertising, freight, photographing, books, stationery, and instruments	10,000	$750,000	$675,000
STEAM MACHINERY (SPECIAL).			
To continue work on new machinery to replace present engines, boilers, etc., of the *Chicago*	300,000	300,000	200,000
To commence new machinery to replace present engines, boilers, etc., of the *Hartford* (submitted)	100,000		
CONTINGENT.			
For contingencies, drawing materials, and instruments for *the drafting room* (act July 26, 1894)	1,000	1,000	1,000

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Steam Engineering, Navy Department—Continued.

Detailed objects of expenditures and explanations.		Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.				
Chief clerk (act July 31, 1894)		$1,800		
1 clerk of class 2 (same act)		1,400		
1 clerk of class 1 (same act)		1,200		
1 assistant messenger (same act)		720		
2 laborers, $660 each (same act)		1,320		
1 chief draftsman (same act)		2,250		
1 assistant draftsman (same act)		1,400		
1 assistant draftsman (same act)		1,000		
			$11,090	$11,000
CIVIL ESTABLISHMENT.				
Navy-yard, Portsmouth, N. H.:				
1 clerk to Department, per annum (act July 26, 1894)	$1,200			
1 messenger (same act)	600			
		1,800		
Navy-yard, Brooklyn, N. Y.:				
1 clerk to Department, per annum (act July 26, 1894)	1,400			
1 writer (same act)	1,000			
1 messenger (same act)	600			
		3,000		
Navy-yard, League Island, Pa.:				
1 clerk to Department, per annum (act July 26, 1894)		1,200		
Navy-yard, Norfolk, Va.:				
1 clerk to Department, per annum (act July 26, 1894)	$1,300			
1 messenger (same act)	600			
		1,900		
Navy-yard, Pensacola, Fla.:				
1 writer, per annum (act July 26, 1894)		1,000		
Navy-yard, Mare Island, Cal.:				
1 clerk to Department, per annum (act July 26, 1894)	$1,400			
1 writer (same act)	1,000			
1 messenger (same act)	600			
		3,000		
			11,000	11,000

Very respectfully,

GEO. W. MELVILLE,
Engineer-in-Chief, U. S. Navy, Chief of Bureau.

The SECRETARY OF THE NAVY.

REPORT

OF

THE PAYMASTER-GENERAL OF THE NAVY.

CHIEF OF THE BUREAU OF SUPPLIES AND ACCOUNTS.

NAVY DEPARTMENT,
BUREAU OF SUPPLIES AND ACCOUNTS,
Washington, D. C., October 30, 1894.

SIR: I have the honor to submit the report of the Paymaster-General of the Navy for the fiscal year ending June 30, 1894, with estimates of appropriations for the coming fiscal year, and tabulated statements, as follows:

A.—General financial statement.
B.—Statement of provisions, clothing and small stores, and contingent.
C.—Statement of expenditures of money and material at shore stations, and objects to which applied.
D.—Statement showing the value of real estate and chattels and machinery plant at the several navy-yards and stations June 30, 1894.
E.—Compilation showing cost of maintaining all naval vessels in commission during year ending June 30, 1894.
F.—Statement showing the value of supplies on hand July 1, 1893, the receipts from purchase and other sources and the expenditures during the year, and the balance on hand June 30, 1894.
G.—Statement of payments through the Paymaster-General's Office on contract, open-purchase and open-contract vouchers during the fiscal year ending June 30, 1894.
H.—Statement of the value of naval stores received and expended on board ships in commission for the year ending June 30, 1894.
I.—Statement of public sales and reports of deposits during the fiscal year 1894 on account of sales of Government property.
J.—Schedule of proposals received.

In pursuance of the policy of the Department, the bureau has given considerable attention during the past year to the work of formulating specifications which shall, when completed, cover all ordinary commercial articles used by the Navy. Much of the delay experienced in filling ships' requisitions has been caused by the lack in them of a proper description of the articles required, and by the difficulty experienced by contractors in obtaining definite information upon which to base bids and to satisfactorily fill orders. As a result of the specifications already published, the bureau has been enabled to secure wider competition than heretofore and to obtain supplies of better quality and at lower prices.

A new edition of specifications covering a very much wider range of articles will soon be completed. Owing to present methods of purchas-

ing and to the painstaking care exercised by inspecting officers at the several yards, and to the chemical and physical tests applied, the Navy is receiving to-day a higher grade of supplies and at lower prices comparatively than ever before.

As the law requires purchases for the Navy, except in special cases, to be made only after public advertisement, a longer time is necessarily consumed in obtaining supplies than if they could be procured in open market and without competition. To obviate as far as possible the unavoidable delay growing out of this the naval supply fund, amounting to $200,000, was established and put into operation a little more than a year ago. The bureau has moved somewhat slowly in the handling of this fund in order to determine by experience just what articles should be purchased under it, and in what quantities they should be carried in stock. The amount of the fund is so small that it will not do to have any portion of it tied up in supplies that are not active or to carry any in quantities larger than the needs of the service demand. Supplies received and to be delivered under the supply fund amount in value to $271,616.98, of which supplies to the value of $94,040.49 have been issued to the several departments and the fund reimbursed by adjustment of the appropriations concerned. The balance in the Treasury, exclusive of all liabilities, is $22,423.51.

With the experience of the past year, and with a clearer understanding at the several yards of the object of the fund and of the method of handling supplies purchased under it, the bureau believes that it will henceforth be able to turn it over more frequently, keeping always in stock a sufficient quantity of such supplies as are in constant demand

The accounts maintained in this bureau now embrace every appropriation made for the Naval Establishment, and cover all expenditures of money and material. They are based on returns received from every ship in commission, from every navy-yard and station, and from every manufacturing department. The labor entailed upon officers making these returns is no doubt irksome and may at times seem to them to be unnecessary; but there can be no question as to the importance of an accurate system of accounts in an establishment maintained at public cost by annual appropriations, the honest and economical administration of which is a matter of public interest as well as a necessary pre-requisite to public favor.

It seems to me proper that there should be given in this report a statement, in detail, showing the manner in which the work of the bureau is handled and the range and completeness of the accounts maintained.

It is believed that such a statement will be of assistance to officers making returns in enabling them to see the object of the work they do and the necessity for it in the statement of an accurate account covering the entire Naval Establishment.

The Bureau of Supplies and Accounts as now organized is practically divided into two divisions, with the work pertaining thereto subdivided into sections, as follows:

FIRST DIVISION—SUPPLIES.

SECTION 1.—*Requisitions*	From ships. From yards and stations.
SECTION 2.—*Purchases*	Open market. Contract. Inspection.

SECTION 3.—*Material*	Increase of the Navy supplies. General stock. Naval supply fund. Provisions. Clothing and small stores. Reserved stores. Condemned stores. Marine stores. Surveys. Sales. Shipments. Outfits and allowances. Supplies afloat.

SECOND DIVISION—ACCOUNTS.

SECTION 1.—*Appropriations*	Requisitions. Vouchers. Remittances. General account. Liabilities. Transfers. Estimates.
SECTION 2.—*Proprietary*	SUPPLIES. Pay department. Other departments. SHIPS. Construction work. Equipage. Cost of commission. Repairs. SHORE STATIONS. Real estate and chattels. Machinery plant. General maintenance. Manufacture and repair. CONTINGENT SUNDRIES. Personnel unassigned. Special duty. Coast and Geodetic Survey. Light-House Establishment. Fish Commission. Models and experiments. Naval militia. Miscellaneous. Deterioration and waste.
SECTION 3.—*Audit*	STATIONS. Purchasing pay officer Paymasters of yards. General storekeepers. Marine officers. SHIPS. Pay officers. Heads of departments. Marine officers. MISCELLANEOUS. Claims. Naval attachés.
SECTION 4.—*Inspection of accounts*	General inspector. Senior officer. Boards of officers.

The work of the bureau, as indicated in the above presentation of divisions and sections, is handled as follows:

FIRST DIVISION—SUPPLIES.

SECTION 1.—*Requisitions.*

For materials and supplies required in the several departments of navy-yards requisitions are made in quadruplicate by the respective general storekeepers upon the Paymaster-General and sent direct to the bureau concerned for approval. Unless held there for some special reason they are acted on at once and the firsts, seconds, and thirds are in possession of this bureau before 2 o'clock of the day they reach the Department. On the same day they go forward for fulfillment by the proper purchasing officer or general storekeeper unless, for some good reason, they are held over for further consideration.

When received in this bureau, bearing the approval of the bureau concerned, they are carefully scrutinized as to the articles, appropriations, certificates, etc., and are noted in a record book according to their serial numbers, under the respective bureaus and yards or ships. In this book is recorded the number of the requisition, date of approval, brief of articles required, vessel for which required (if for a vessel), and where to be procured.

From ships.—Requisitions from ships at navy-yards go directly to general storekeepers upon the approval of the commandant, but those from ships not at navy yards are forwarded to the bureau for action. When received they are stamped with directions for shipment and one copy forwarded to the general storekeeper of the yard from which the supplies are to be furnished, one copy to the ship requiring the stores as information of the action taken, and one copy filed.

From yards and stations.—On requisitions from general storekeepers or chiefs of bureaus the action directed is noted: "To be advertised," "To be purchased in open market," or "To be shipped" from some other yard. The "first" of the requisition goes to the commandant of the yard from which it emanates for his information as to the action taken, and the "second" to the purchasing pay officer who is to make the purchase, or to the bureau clerk in charge of the preparation of schedules and contracts if the articles are to be procured after advertisement, or to the general storekeeper of the yard from which the articles are to be supplied in cases of shipments.

Frequently a requisition is filled from several sources, in which case additional shipment orders are necessary.

The "third," on which appears the estimated cost, is filed according to its serial number in an open box, there being a separate box for each bureau, for ready reference and the entry of further data as received.

SECTION 2.—*Purchases.*

Open market.—Purchases in open market are made, after public competition, by the purchasing pay officers of the various stations upon the receipt of requisitions bearing the order of the Paymaster-General to make such purchases. When the bids received are in excess of the estimated cost stated in the requisition they are submitted for instructions to the Paymaster-General, by whom they are referred to the bureaus concerned for recommendation. Reports of purchases are received daily, stating to whom invitations for proposals have been sent,

orders have been placed, the prices at which the articles are to nished, and the date upon which delivery is due.

re is also a daily report of articles on open-purchase requisitions ie or rejected, prepared by the general storekeeper and forwarded bureau through the purchasing pay officer who notes thereon formation he may obtain as to cause of delay, when articles are sed to be delivered, and any action taken by him to expedite ry, so that the bureau is constantly informed as to the condition n-purchase requisitions and can take such action as may be con- d necessary.

m these reports the records on requisitions, based upon previous s, are corrected.

tract.—For purchases after advertisement the requirements and ications are scanned, and the schedules of supplies required pre- in the bureau and distributed to manufacturers and dealers gh the navy pay offices and yards. The bids, received in dupli- are opened in the bureau and recorded as read in a book of ord of bids received," from which the report required by Congress pared. After being carefully examined as to correctness of form he computations verified, the proposals are submitted to the us concerned for recommendation, and upon their return the ls are made by the Paymaster-General.

contracts are then prepared and transmitted for execution to the actors.

on the return of the executed contract five copies are made and outed as follows: One to the contractor, one to the navy-yard at the supplies were to be delivered, one to the bureau concerned, ccompanied by the duplicates of all proposals received, to the s office, Interior Department, and one retained in the Bureau of ies and Accounts.

original contract is filed with the Comptroller of the Treasury. copy retained in the bureau is filed in a binder until one hun- contracts accumulate, when they are bound, a proper index under yards, numbers and articles being constantly maintained. A is made on a form attached to each contract of all deliveries as ted and the amounts paid on vouchers pertaining to it. In this ction an index is kept from which can be obtained the prices paid l articles purchased under contract for reference in preparing ates, comparison with proposals, and information of the tendency market.

h week a statement is prepared of all contracts not completed, uch action taken as is deemed necessary to enforce deliveries or re the articles in open market for the contractor's account.

pection.—All supplies purchased are subject to inspection before tance. Those which are by the terms of purchase deliverable at ace of manufacture are inspected by an officer either on duty at orks or specially designated. The reports of inspection are made lorsement on the manufacturers' bills forwarded to the proper al storekeeper or to the Bureau of Supplies and Accounts as the nay be.

se supplies which by the terms of purchase are delivered at a yard are inspected by a board of officers. The results of such tions, stating quantities received and passed, quantities rejected of rejection, etc., are embraced in the report of the board of tion transmitted to the bureau daily from the larger yards and y from the yards where the volume of business is small.

The facts appearing in these reports are entered on the open purchase requisition or on the copy of the contract concerned on file in the bureau, so that, at all times, the exact condition of the requisition or contract as to deliveries and rejections is presented.

SECTION 3.—*Material.*

Supplies at navy-yards are in charge of general storekeepers who submit to the Bureau of Supplies and Accounts quarterly returns thereof. The law provides that all supplies purchased with moneys appropriated for the naval service shall be deemed to be purchased for the Navy and issued without regard to the bureau for which they were purchased. The accounting officers of the Treasury have, however, ruled that the appropriations under "Increase of the Navy," being for the specific purpose of increasing the Navy and not for the naval service in general, do not come within the above provision; that the appropriation "Provisions" is for a specific purpose, based upon the legal allowance of 30 cents per day to each person in the service, and can not be used for any other object; and that the appropriation for clothing and small stores is a self-sustaining fund and can not be classified as provided for by the act. To avoid the confusion which would otherwise result under these decisions, and for greater convenience of record, separate accounts are maintained as follows:

Increase of the Navy supplies.—This account embraces all supplies purchased for the purpose. The return is in the form of a balance sheet, rendered quarterly, representing the value of receipts, expenditures, and balances, accompanied by all invoices of receipt and expenditure, and an abstract showing the total expenditures for use to each department and the object as indicated by titles and subtitles.

General stock.—This account embraces all supplies purchased under the annual appropriations for general issue. The quarterly return to the bureau is of the same character as that for increase of the Navy supplies. In addition a material account is kept, by the card system, in the bureau. These cards are a record of material on hand available for general issue deduced from the inventories taken at the several yards and the reports of expenditures of articles only, forwarded daily to the bureau by the respective general storekeepers. These cards, numbering some 46,250, give the quantity in detail as to sizes, dimensions, etc., of every article, at all navy-yards, which can be issued to any department or shipped to other yards.

Under the regulations supplies purchased during any fiscal year are reserved during that year for the use of the department for which purchased. Being thus reserved they can not be issued to other departments or shipped to other yards without special authority. Such articles, therefore, are not taken up on the cards as their main object is to indicate where requisitions from any bureau can be filled and purchase obviated. At the beginning of the fiscal year, however, a report is made to the bureau of all supplies purchased during the year remaining on hand at the close of the previous year, which, having thus become available for general issue, are so taken up on the cards.

Reference to these cards has enabled the shipment of large quantities of material to fill requisitions, resulting in a large decrease in the quantity of old stores on hand and a corresponding saving in purchase.

Naval supply fund.—It is the purpose of the bureau to keep on hand at the three principal yards a stock of ordinary commercial articles for issue to all departments, that the delays incident to purchase in open

ket for immediate requirements may be obviated, that by foreseeing requirements sufficiently in advance the advantage of the reduced s at which supplies can be procured after advertisement and con- may be secured, and that the bureau may watch and take advan- of the market in making these contracts. For stores issued to the ral departments the fund is reimbursed from the proper appropria- by transfer on the books of the Treasury Department on weekly sfer statements, prepared by general storekeepers and submitted his bureau to the accounting officers after the required entries in books of the bureau. That the several bureaus may be advised as e charges against their appropriations for this account a statement ich charges is furnished weekly. That reimbursement for every issued may be insured, and to be properly informed as to expendi- s and consequent probable requirements, a card material account r this fund is also kept in the bureau from the deliveries under racts and daily reports of expenditures from general storekeepers.

rovisions.—This account pertains only to the provisions for the y. The quarterly return differs from those for the preceding unts in that it embraces both quantities and values. The great ation in the established naval rations, the exact relation of the ponent parts to each other, the limitation as to their quantities, and accountability as to exact issues by the officers of ships to whom sferred, make an exact return of quantities as well as values neces- . These supplies being subject to rapid deterioration, as compared others, but a limited stock is maintained, so that a weekly return antities on hand is also received from which the bureau can deter- as to the necessity for the procurement of additional supplies to requirements.

othing and small stores.—This account pertains to supplies pur- ed and manufactured under the clothing and small stores fund. The terly return from the general storekeeper is one embracing both tities and values that the price at which each item is transferred be scrutinized and the officer receiving the stores held to issuing and charging the accounts of the men at the correct prices, that und may be properly reimbursed. The return from the officer in ge of the clothing factory shows the receipts of material used in ufacture and the finished garments turned over to the general keeper for issue.

served stores.—This account embraces stores transferred to it from preceding accounts to be held for delivery to specified ships, or h have been turned in from ships in commission, or upon going out mmission, to be reserved for their future use. The return is a terly balance sheet of values accompanied by substantiating receipt expenditure vouchers. Each article being held for a specific pur- a material return would be useless.

ndemned stores.—The account embraces unserviceable and obsolete s which have been condemned by survey and are held for sale. balance sheets show the original value of stores condemned, their ised value, and the loss to the Government by appraisal and sale. aterial report is received, the stores having practically ceased to g to the Navy and being held only until such time as a sale can onsummated and the proceeds deposited in the Treasury under cellaneous receipts" from which the Navy derives no advantage.

rine stores.—These returns are rendered quarterly and embrace all ing, furniture, and other public property in the hands of officers of

the Marine Corps at shore stations. It is a material return, presenting balances, receipts, and expenditures.

Surveys.—All reports of surveys on stores at navy-yards considered unserviceable, needing repairs, requiring revaluation, etc., are forwarded to the bureau for the action of the Paymaster-General. When necessary they are referred to the several bureaus for recommendation and to the Department when sales are involved, and, upon return, the proper action is taken and the report forwarded to the yard concerned. One copy of the report is retained for reference in the bureau and for consideration in connection with schedules of sales.

Sales.—The Bureau of Supplies and Accounts is charged by the regulations with the conduct of sales of condemned property. It sees that the law has been complied with as to condemnation, appraisal, etc., and when a sufficient quantity of condemned material has accumulated at any yard, gives directions to make the necessary preparations for the sale. The authority of the Department is secured at the proper time, the advertisement prepared, the schedule of material printed and the sale directed.

Shipments.—Orders for shipments of supplies are under the regulations properly issued only by the Paymaster-General. Each shipment order receives a number, a separate series for each bureau being maintained, by which it is thereafter identified in its relation to invoices, bills of lading, freight bills, etc. When the request for a shipment is received a shipment order is issued to the commandant of the yard from which the shipment is to be made and the request, with an indorsement that the shipment has been directed, is forwarded to the consignee for his information and return. When the shipment is actually made the fact is reported by the general storekeeper and notice given by this bureau to the bureau concerned. When a shipment is received a similar report is made to this bureau by the consignee.

The shipment orders during the past year numbered 1,926.

Outfits and allowances.—When the prescribed outfit and allowance of supplies for a ship is received from the several bureaus it is scrutinized and any necessary corrections as to the classification or arrangement of items or headings made. Under the direction of the Paymaster-General the allowances for each ship under all the bureaus are printed in one book, and the general storekeeper of the yard where the ship is to be fitted out furnished with a copy and directed to make the necessary requisitions and assemble the stores. Copies of the book are supplied to the several bureaus, navy-yards, and ship concerned. Changes in the prescribed allowance are reported to this bureau and the necessary corrections made in the copies of the books on hand, and notice given to those to whom the books have been furnished.

Supplies afloat.—Supplies on board ships are in the custody of the heads of departments who make returns thereof to the Paymaster-General. For provisions, clothing, and small stores the pay officer makes a quarterly return of quantities and values, a return of quantities in the case of provisions being necessary that he shall be restricted to issuing the component parts of the ration as prescribed by law for each ration and for the number of persons on board entitled to subsistence in kind, and in the case of clothing and small stores that the articles shall be issued at the proper prices and charged against the individual accounts of the persons drawing them. For other supplies, in charge of the several heads of departments, the return is in the form of a balance sheet, the same in character as that rendered by general storekeepers ashore. The return presents money values only,

receipts and expenditures of articles being shown by the invoices mpanying the balance sheet to substantiate the entries.

SECOND DIVISION—ACCOUNTS.

r the act of March 2, 1889, it is the duty of the Bureau of Supplies Accounts to cause property accounts to be kept of all the supplies aining to the Naval Establishment, and to report annually to Con- s the money value of the supplies on hand at the various stations e beginning of the fiscal year, the disposition thereof, and of the hases and the expenditures of supplies for the year, and the balances aining on hand at the end thereof.

mplying with the requirements of the above act, a comprehensive ral system of accounts, covering all the financial affairs of the Naval blishment, is maintained under the direction of the Paymaster- eral.

SECTION 1.—*Appropriations.*

nder this head there is kept a general account showing the con- n at all times of each appropriation, a personal account with each ursing officer, and a liability account.

equisitions.—All requisitions upon the Secretary of the Navy for ls advanced to disbursing officers are prepared in this bureau. y are signed by the chief of bureau concerned, but the requisitions drawn in the Bureau of Supplies and Accounts and sent to the ral bureaus for signature. The amounts so advanced are based requisitions received from purchasing pay officers to pay labor officers' rolls; from pay officers of ships for running expenses and of officers, enlisted men, and marines afloat; from the paymaster quartermaster of the Marine Corps, to pay marines ashore, com- ed rations, and other allowances; and upon the amounts required ay vouchers audited in the bureau and Fourth Auditor's certificates 'arded to the bureau for payment.

ills of exchange on the Secretary of the Navy and reports by the rth Auditor are covered by direct requisition on the Treasury.

record of all requisitions drawn, being a book for each bureau of er form for the purpose, is kept. In these books are entered a script of each requisition, giving the number and date of the isition, the name and station of the pay officer, and the amount r each appropriation. The total amount of each requisition is also red seriatim for each bureau in the general book of requisitions. he end of each month the amounts drawn under each appropria- as shown by the bureau requisition books, are posted, and the s balanced with the total amount drawn. When the requisitions prepared they are sent for examination and signature to the proper au, accompanied by the pay officer's request for funds and copies e bills covered by the requisition.

e number of requisitions drawn during the fiscal year 1894 was 7.

vchers.—Vouchers for supplies are generally prepared by the gen- storekeeper of the yard at which deliveries are made. These hers being paid on the order of the Paymaster-General they are arded to the bureau for such order, and, to protect the officer making payment, they are carefully examined. The articles are all checked rom the requisition authorizing the purchase or on the contract, putations are verified and the voucher thoroughly scrutinized as to

appropriations and as to the certificates and evidence necessary to carry the voucher when submitted to the Auditor for the Navy Department in settlement of the disbursing officer's accounts.

As vouchers are passed, the amounts, or so much thereof as pertains to any requisition, are entered on the requisition.

A number of vouchers on account of bureau requisitions, transportation, Pay miscellaneous, advertising, and miscellaneous bills, are prepared entirely in the bureau.

Auditor's certificates are forwarded for payment to the pay officer designated. They are recorded in a register of certificates and reports.

The number of vouchers examined and passed during the fiscal year 1894 was 20,603.

Remittances.—Pay officers' requisitions and vouchers having been examined and the requisitions drawn upon the Secretary, the vouchers are properly arranged and distributed and letters of advice sent to each pay officer of the amounts drawn in his favor under the various appropriations, accompanied by the vouchers to be paid and a list stating the names of the contractors and the amount to be paid each.

The retained copies of vouchers are properly stamped and numbered, and with the press copies of letters of advice and lists are jacketed and filed.

General account.—For the general account of appropriations the following books are kept:

Register of requisitions for advances and payments.
Register of requisitions for repayments.
Ledger of appropriations.
Journal.
Record of warrants.
Record of bills of exchange drawn by pay officers of ships.

In this branch of the office the bureau requisitions are consolidated into requisitions to be drawn by the Secretary of the Navy on the Treasury, all adjustments and deposit requisitions entered, and requisitions to settle Fourth Auditor's reports drawn. A record of requisitions drawn and of refunding requisitions is kept, the amounts posted in the ledger of appropriations, and warrants of appropriations are journalized, and the amounts posted to the proper accounts.

The annual statement derived from these books is shown in Appendix A.

A general account of money expended and personal accounts with disbursing officers charged with public funds pertaining to the Naval Establishment are maintained.

The following books are used:

No. 1. Advances to pay officers.
No. 2. Accounts of pay officers at navy-yards and purchasing pay officers.
No. 3. Abstract of quarterly accounts of ships' pay officers.
No. 4. Tabulation book.
No. 5. Money journal.
No. 6. Money ledger.
No. 7. Expenditure journal.
No. 8. Expenditure ledger.

Advances to pay officers of navy-yards and purchasing pay officers are entered from the general requisition book by months in the book of advances to pay officers and arranged to show totals by bureaus.

From this book and the monthly money statements received from pay officers, accounts are made in the book of accounts of pay officers with pay officers of navy-yards and purchasing pay officers, which show advances, receipts, payments, and balances under three heads,

"On account of the Secretary's Office," "Vouchers," and "Labor ."

ıese accounts are tabulated and journalized in the money journal posted by totals in the money ledger.

ıe quarterly accounts of pay officers of ships are analyzed in the ract of quarterly accounts and tabulated from the abstract in the lation book.

ıe results of this tabulation are journalized in the money journal posted to the money ledger.

ccounts current of purchasing pay officers are tabulated in the lation book and the results journalized and posted to the money er.

ccounts from the fiscal agents London, England, attachés, and r miscellaneous accounts, showing receipts and expenditures of ey, are analyzed, tabulated, and journalized in the money journal posted to the money ledger.

ıy-roll summaries of ships in commission and quarterly summaries ıvy-yard rolls are tabulated in the tabulation book and the results ıalized in the expenditure journal and posted to the expenditure er. Also "direct payments" by Secretary's office, fiscal agents ondon, and attachés abroad are tabulated, journalized, and posted ıe expenditure ledger.

ıe purpose of these books is to present the annual general money nditures on account of the Naval Establishment for the fiscal year the purposes for which the expenditures were made.

ıis presentation for the fiscal year 1894 appears as Appendix A.

abilities.—For the purpose of showing at all times the balances lable under the various appropriations a ledger of liabilities, orized or incurred, is kept.

ı account of labor, the charges are entered from the remittances uch payments.

r expenditures for supplies and services authorized by approved isitions the data for the charges are recorded on each requisition. n the requisition is first approved the estimated cost is charged nst the appropriation. As the reports of purchases are received entered on the requisition proper adjustments are made and the opriation debited or credited with the difference between the esti- ed cost and the actual cost at which the order was placed. As the hers on account of a requisition are received the articles appearing he bill are checked off the requisition and the amounts of the hers entered. Any necessary adjustment, due to deficit or excess elivery, between the purchase order and the amount actually paid, operly debited or credited.

abilities on account of contracts are charged up immediately upon award of the contracts, and adjustments made when completed. enditures by ships are charged from the monthly summaries of pay officers. Advances by the fiscal agents at London to attachés others on duty abroad are charged on the letters authorizing such ınces, traveling expenses on the certificates for payments, mileage eports of purchasing pay officers, and transfers of appropriations he statements sent to the Auditor for the Navy Department. The s maintained are a ledger, auxiliary ledger, journal, and tabula- book.

statement of the balance available under each appropriation r its cognizance, is furnished weekly to each bureau.

Transfers.—Transfers of appropriations on account of the naval supply fund and on account of appropriations properly chargeable for supplies used, but purchased from other appropriations, are made on statements, accompanied by necessary invoices, submitted by this bureau to the Auditor for the Navy Department.

SECTION 2.—*Proprietary.*

The general proprietary account embraces the money, real estate, ships, and other property of the Naval Establishment. Debits and credits under various titles and subtitles are derived from the vouchers which mark all movements or uses of naval supplies or money, and all final expenditures of money and material are appropriately charged under the general heads of (*a*) supplies, (*b*) ships, (*c*) shore stations, and (*d*) contingent sundries. The ledger accounts, in which final outlays of money and supplies lodge, are arranged with reference to natural heads of expenditures.

All disbursements of money on account of public bills are entered in the bill book of the proper bureau with reference to the several titles directly from the "thirds" of the vouchers on file in the bureau. Appendix G is a statement deduced from this bill book. At the end of each quarter recapitulations are made showing the aggregate amount chargeable to each title and subtitle under each appropriation. The recapitulation is then journalized and posted in the respective ledgers, there being one for each title. In the same manner the monthly pay roll summaries from the various heads of departments at the several navy-yards are aggregated and recapitulated every quarter, the recapitulations showing the titles, subtitles, bureaus, and appropriations under which labor has been performed, and the recapitulations journalized and posted in the proper ledger.

The summaries of expenditures of material "for use" accompanying general storekeepers' quarterly returns indicate the titles and subtitles under which these expenditures are made. These summaries are also recapitulated, journalized, and posted in the ledger for the title under which the expenditures were made.

Every expenditure of money and material at shore stations is thus charged to titles and subtitles to which it is applied and the respective appropriations and material account duly credited.

In the same manner from the returns of heads of departments of ships and the pay-roll summaries the proper charges under the several titles are made.

(*a*) SUPPLIES.

In this account all material, supplies, and manufactured articles are borne between the times of purchase or manufacture and ultimate use. It is based upon the property returns of officers in charge of supplies.

Pay department.—The accounts of provisions, contingent, clothing, and small stores are kept in seven books of permanent record, viz:

(1) Record of settlement of quarterly accounts of all pay officers, being an abstract of the quarterly return of each officer.

(2) Abstract of receipts and expenditures, being an aggregation of the above under each form of receipt and expenditure and totalized each quarter for journal entry.

(3) Journal, showing the amount of money drawn during each month from the clothing and small stores fund, the amounts charged to the

l by adjustment by the Auditor on account of General Account of 'ances, the credits to the fund by adjustments and settlement of ınnts in the Auditor's office, amount paid for labor in the clothing ɔry, and the total receipts and expenditures at yards and on board s.

) Ledger, showing the condition of the accounts of provisions, cloth- ınd small stores fund, and contingent stores Supplies and Accounts.

) Transit account, showing the value of each invoice passed 'een pay officers and if properly taken up.

) Purchases and payments, being a bill book of all public bills paid ı the bureau's appropriations for supplies delivered at navy-yards.

) Miscellaneous, being a memorandum of the number of rations ɔd to crew and marines, value of commuted rations, average cost of ɔns issued, value of rations credited to hospital fund, rations checked ınauthorized absence, amounts paid for freight, etc.

ıe annual statement obtained from these accounts appears in endix B.

her departments.—Ledger accounts for general supplies are kept all general storekeepers and with heads of departments of ships, ıich they are debited and credited with their receipts and expendi- ı. The accounts show the sources of all receipts, the various objects ɛpenditures, and the balances of material on hand at every navy- and in each department of every ship in commission. For ships' ınts there has been a ledger for each bureau, embracing all ships ·mmission as the returns are made separately for each bureau by 'epresentative on board. A new system has been devised for the ıtenance of these accounts by which but one general ledger will be ired hereafter. For general storekeepers' returns, embracing all ral supplies without distinction, there is but one ledger in which nditures are charged under the proper titles and departments. A sit account showing transactions by invoices is also maintained.

ıe annual statements deduced from these accounts are shown in endix F for general storekeepers of navy-yards and Appendix H ıeads of departments on board ships.

ɜHIPS.

e account ships comprises special accounts under the following ɜ as prescribed by naval regulations:

nstruction work. (*See* Appendix C, Title A.)

ıuipage. (*See* Appendix C, Title B.)

st of commission. (*See* Appendix E.)

ıpairs. (*See* Appendix C, Title D.)

ıHORE STATIONS.

is account comprises special accounts defined by regulations under ɛeneral titles:

ɜal estate and chattels. (*See* Appendix C, Title E, and Appendix

ıchinery plant. (*See* Appendix C, Title F.)

ɜneral maintenance. (*See* Appendix C, Title G.)

ınufacture and repair. (*See* Appendix C, Title Z.)

(*d*) CONTINGENT SUNDRIES.

The account contingent sundries comprises, under the following titles, accounts of various expenditures under naval appropriations that are not included in the preceding accounts, viz:

Personnel unassigned. (*See* Appendix A.)
Special duty. (*See* Appendix A.)
Coast and Geodetic Survey. (*See* Appendix A.)
Light-House Establishment. (*See* Appendix A.)
Fish Commission. (*See* Appendix A.)
Models and experiments. (*See* Appendix C.)
Naval militia. (*See* Appendix C.)
Miscellaneous. (*See* Appendix C.)
Deterioration and waste. (*See* Appendix C.)

An account of sale, covering all transactions in connection with each sale of condemned Government property, with the names of purchasers, is received from the paymaster of the yard and the required report to Congress made therefrom. (*See* Appendix I.)

The books maintained under the several accounts (*b*) ships, (*c*) shore stations, and (*d*) contingent sundries are intimately connected or used in conjunction, and embrace the following:

1 ledger, cost and valuation of ships.
1 ledger, equipage of ships.
1 ledger, cost of commission.
1 ledger, repairs of vessels.
1 ledger, real estate and chattels.
1 ledger, machinery plant.
1 ledger, general maintenance, models and experiments, naval militia, deterioration and waste, and miscellaneous.
1 ledger, conversion account (manufactures and repairs).
1 journal, money vouchers.
1 journal, labor.
1 journal, material.
2 journals, general storekeepers' returns.
1 journal, ships' returns.
1 distribution book, expenditures for labor.
1 distribution book, expenditures for material.
8 memorandum books, for aggregating and recapitulating summaries and reports of expenditures of money and material.

SECTION 3.—*Audit.*

The audit of accounts in the bureau embraces all property accounts of officers charged with the receipt, custody, care, and expenditure of public property, and money accounts so far as pertains to the examination and verification of public vouchers for supplies and services and the advances made to pay officers. The auditing of money accounts, so far as expenditures are concerned, is done by the Auditor for the Navy Department.

STATIONS.

Embracing the accounts of officers at shore stations.

Purchasing pay officers.—The audit of these accounts consists of an examination of their monthly money statements with reference to seeing that all advances on account of requisitions for funds for miscellaneous expenditures and remittances to cover vouchers directed to be paid by the Paymaster-General are taken up and expended under the proper appropriations, and that such expenditures are properly sum-

marized on the summary of account current under the respective titles and subtitles.

As has been heretofore stated, all vouchers transmitted by the Paymaster-General for settlement and for which remittances are made are carefully examined to insure their being in correct form to satisfy the requirements of the Auditor.

When first received they are considered with reference to any marked irregularities necessitating correspondence, and are then passed on for the detailed examination.

The articles embraced in a voucher are checked off on the requisition authorizing the purchase, or on the contract, that articles may not be charged a second time, the further examination (before explained) made, and the amounts covered by the vouchers entered on the contract or requisition to which they pertain for future use of the liability clerk. The vouchers are then listed and forwarded to the several bureaus for such examination as they may desire to make and return to the bureau.

When returned, the total amount directed to be paid and the purchasing pay officer who is to make the payment is filled in and the vouchers presented to the Paymaster-General for signature.

Paymasters of yards.—The audit of these accounts consists of an examination of the monthly summary statement with reference to the pay officer properly charging himself with remittances and expending the funds received under the proper appropriations, and, as the pay roll of the officers and enlisted men does not come to the bureau, to see that the pay roll summary thereof properly shows the gross amount chargeable thereon to each title and subtitle embraced in the same.

General storekeepers.—(1) The audit of these accounts consists of an examination of the balance sheets under "Increase of the Navy," "General stock," "Reserved stores," and "Condemned stores" from the various yards. The debits are verified from the amounts chargeable to the account "Supplies," as shown by the bill book, the invoices appearing in the transit account book, and reports of survey, appraisal, etc., and the credits must be substantiated by properly receipted vouchers or by surveys. It involves a careful examination of each receipt and expenditure voucher, and seeing that each voucher is properly inscribed and expenditures made under the proper account and correctly charged thereto. Number of accounts audited during past year, 187.

(2) An examination of the balance sheet of stores under the naval supply fund and of the weekly transfer statements and statement of charges to the several bureaus on account of the fund. The debits are verified by the contract bills and the credits by the weekly statements and receipted invoices attached thereto. Number of accounts audited during the year: Balance sheets, 12; weekly statements, 783.

(3) An examination of the quarterly returns of provisions, clothing and small stores, and contingent stores, both as to quantities and values, verified in the same manner as the preceding, and also as to itemized prices at which expenditures are made. The accounts of the clothing factory are embraced under this head, and the application of material and labor to completed manufactures carefully examined. Number of accounts audited during the year, 128.

Marine officers.—The audit of these accounts embraces the receipt and expenditure of marine clothing manufactured under the direction of the assistant quartermaster at Philadelphia and of other Government property in the hands of marine officers ashore. Number of accounts audited during the year, 200.

SHIPS.

Embracing the accounts of officers afloat.

Pay officers.—The audit of these accounts consists of an examination of the quarterly returns of provisions, clothing and small stores, and contingent stores on board ships.

The debits are verified by the public bills rendered with summary statements and by transfers from general storekeepers and other pay officers as deduced from credits in their accounts as established by receipted invoices, and the expenditures by receipted invoices and authorized issues. With provisions these issues are established by the number of men drawing rations and the exact quantity of each article of provisions forming the several variations of the ration established by law. Issues of provisions to messes or vessels in distress for cash are reported to the Auditor that it may be seen that the necessary charge against the officer concerned has been made in his cash account. Issues of clothing and small stores being charged on the pay roll to the individual accounts of the persons drawing the articles, a report is made to the Auditor of all expenditures appearing on this account that he may see that the rolls embrace the issues claimed. Number of accounts audited during the year, 577.

Heads of departments.—The audit of these accounts consists of an examination of the balance sheets rendered by the head of each department of every ship. The debits are verified by the receipted invoices submitted by general storekeepers or officers of other ships and by public bills appearing on the summary statement of the pay officer of the ship. The credits, by transfer invoices, invoices of expenditures for use authorized by the commanding officer, and by surveys. Number of accounts audited during the year, 936.

Marine officers.—The audit of these accounts embraces the receipt and expenditure of marine clothing, etc., in charge of marine officers on board ships. Number of accounts audited during year, 160.

MISCELLANEOUS.

Embracing claims and other miscellaneous accounts.

Claims.—All bills for transportation of men and stores over land grant and bonded railways through the quartermaster department of the Army are examined in the bureau prior to being sent to the accounting officer of the Treasury for settlement. Owing to the number of roads likely to be involved in one shipment, the different classifications as to the character of supplies and rates of the various roads, the omission of data necessary to adjudication, and numerous other questions constantly arising, a great deal of labor and correspondence in connection with these claims results. Number of transportation claims during past year, 374.

All claims for traveling expenses incurred by officers traveling abroad under orders and by civil employés in the United States are examined in the bureau and the proper allowances certified to the Department for approval by the Secretary and transmission to the Auditor for the issue of certificates. Number of claims certified during the past year, 184.

Naval attachés.—The accounts of naval attachés, embracing remittances and expenditures on account of individual expenses and the expenses of students abroad, are examined in the bureau and the proper allowances certified to the Department for the approval of the Secretary and transmission to the Auditor for settlement. Number of accounts examined during past year, 26.

SECTION 4.—*Inspection of pay officers.*

he reports of the personal inspections of the accounts of pay officers forwarded to the Paymaster-General and carefully examined. The ı balances are verified in connection with the monthly summary ement and lists of checks drawn each month submitted therewith pay officers, and the monthly statement of disbursing officers' ›unts, giving the number, date, and amount of each check paid, for- ded from the several depositories, at the close of each month, to ı pay officer through the Paymaster-General. That there shall be .elay in the receipt of these statements by the pay officers concerned, that there may be a permanent record of outstanding checks for ıre consideration, each of these statements is copied immediately ı its receipt and forwarded.

here is also received from each pay officer at shore stations a weekly ement of public funds, stating the amounts on deposit in the sev- depositories, and the cash on hand at the end of each week. These ements are referred to the Treasurer of the United States for exam- :ion and return, with statement as to balances as shown by the books he depositories.

he labor devolving upon the Bureau in the maintenance of the com- hensive system of accounts here described is very great, and the racter of it such as to render it absolutely necessary that only care- expert, and zealous clerks should be employed.

›uring the past year the card index system has been applied to all respondence and records so far as is practicable, covering every- ıg except accounts necessarily requiring the maintenance of books.

'he law passed during the last session of Congress requiring all dis- sing officers of the Government to mail or otherwise send to the ›per officer at Washington their quarterly accounts within twenty ⁄s after the period to which they relate, is one with which it is ⁄sically impossible for disbursing officers of the Navy in all cases to ›ply. Especially is this true of pay officers attached to cruising and eiving ships, and the principal yards and purchasing pay officers.

Cruising ships are liable to be beyond the reach of a post-office at › time when, under the law, the accounts must be mailed.

'he facilities for clerical work on shipboard are exceedingly limited. king it always difficult, while at times it is rendered absolutely ›ossible by the condition of the weather.

'n board the principal receiving ships changes are constantly tak- place by reason of the transfer of men to other ships, often at a nent's notice, rendering current work so continuous and its demands nexpected and imperative as to make it impossible to have the rterly accounts, which are exceedingly voluminous, always ready for ling within twenty days after the period to which they relate.

earnestly recommend that Congress be asked to modify the present so far as it relates to disbursing officers of the Navy attached to sing ships, to the Coast Survey vessels, to the receiving ships at ⁄ York, Newport, Norfolk, and Mare Island, and to the purchasing officers at San Francisco, New York, and Washington, and that the ə allowed these officers for rendering quarterly returns be that here- re allowed by regulations, and that in the cases of officers detached ı ships the time be counted from the date they reach their homes.

Very respectfully, EDWIN STEWART,
Paymaster-General, U. S. Navy.

[on. HILARY A. HERBERT,
Secretary of the Navy.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Supplies and Accounts, Navy Department.

Detailed objects of expenditure, and explanations.		Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.				
1 chief clerk (R. S., p. 27, sec. 167; R. S., p. 70, sec. 416, and act July 31, 1894)		$1,800.00		
2 clerks class 4 (same act)		3,600.00		
3 clerks class 3 (same act)		4,800.00		
2 clerks class 2 (same act)		2,800.00		
2 stenographers, at $1,400 each (same act)		2,800.00		
11 clerks class 1 (same act)		13,200.00		
4 clerks, at $1,000 each (same act)		4,000.00		
2 copyists (same act)		1,800.00		
1 assistant messenger (same act)		720.00		
2 laborers (same act)		1,320.00		
Total			$36,840.00	$36,840.00
PROVISIONS, NAVY.				
For provisions and commuted rations for the seamen and marines, which commuted rations may be paid to caterers of messes upon orders of the commanding officer; commuted rations for officers on sea duty and naval cadets, and commuted rations stopped on account of sick in hospital and credited to the naval hospital fund; subsistence of officers and men unavoidably detained or absent from vessels to which attached under orders (during which subsistence rations to be stopped on board ship and no credit for commutation therefor to be given), and fresh water for drinking and cooking purposes. (R. S., p. 733, secs. 3709-3747; act May 12, 1879, vol. 21, p. 3, sec. 1, and act July 26, 1894)		1,075,000.00		
Labor in general storehouses and paymasters' offices in navy-yards, including a chemist, at $2,000 per annum (same act)		100,000.00	1,175,000.00	1,175,000.00
NOTE.—The clause, "which commuted rations may be paid to caterers of messes upon orders of the commanding officer," is inserted under the head of provisions, for the protection of caterers of messes in cases of death or desertion.				
CIVIL ESTABLISHMENT.				
Navy-yard, Portsmouth, N. H. (Jan. 30, 1885, vol. 23, p. 295, sec. 3; July 26, 1894):				
In general storehouses—				
2 bookkeepers, at $1,200 each	$2,400.00			
1 assistant bookkeeper	720.00			
1 bill clerk	1,000.00			
1 assistant clerk	720.00			
1 shipping and receiving clerk	1,000.00			
Total		5,840.00		
Navy-yard, Boston, Mass.:				
In general storehouses—				
1 bookkeeper	$1,017.25			
1 shipping clerk	1,000.00			
1 receiving clerk	1,000.00			
In yard pay office—				
1 writer	1,017.25			
Total		4,034.50		
Navy-yard, Brooklyn, N. Y. (same act):				
1 writer to boards of inspection	$900.00			
In general storehouses				
3 bookkeepers, at $1,200 each	3,600.00			
1 assistant bookkeeper	1,000.00			
1 assistant bookkeeper	720.00			
3 receiving clerks, at $4 per diem each	3,768.00			
1 assistant receiving clerk	1,099.00			
3 shipping clerks, at $1,000 each	3,000.00			
1 bill clerk	1,000.00			
1 assistant bill clerk	720.00			
2 leading men, at $2.50 per diem each	1,570.00			
5 pressmen, at $2.76 per diem each	4,333.20			
1 superintendent of coffee mills, at $3 per diem	942.00			

Estimates of appropriations required for the service of the fiscal year, etc.—Continued.

Detailed objects of expenditure, and explanations.		Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
CIVIL ESTABLISHMENT—continued.				
Navy-yard, Brooklyn, N. Y. (same act):—Cont'd.				
In general storehouses—Continued.				
1 box-maker, at $3 per diem	$942.00			
1 engine-tender, at $3.26 per diem	1,023.64			
1 coffee-roaster, at $2.50 per diem	785.00			
1 fireman, at $2 per diem	628.00			
1 messenger, at $2.25 per diem	706.50			
In yard pay office:				
1 writer	1,017.25			
1 messenger, at $2.25 per diem	706.50			
Total		$28,461.09		
Navy-yard, League Island, Pa. (same act):				
In general storehouses—				
1 bookkeeper	$1,200.00			
1 assistant bookkeeper	720.00			
Total		1,920.00		
Navy-yard, Washington, D. C. (same act):				
In general storehouses—				
1 bookkeeper	$1,200.00			
1 clerk	1,200.00			
1 receiving clerk	1,000.00			
1 bill clerk	1,000.00			
1 shipping clerk	1,000.00			
In yard pay office—				
1 writer	1,017.25			
Total		6,417.25		
Naval Academy, Annapolis, Md. (same act):				
In general storehouse:				
1 bookkeeper	$1,017.25			
1 receiving and shipping clerk	1,000.00			
Total		2,017.25		
Naval station, Newport, R. I. (same act):				
In general storehouse:				
1 clerk		1,200.00		
Navy-yard, Mare Island, Cal. (same act):				
In general storehouses:				
2 bookkeepers, at $1,200 each	$2,400.00			
2 assistant bookkeepers, at $720 each	1,440.00			
1 receiving clerk	1,000.00			
1 shipping clerk	1,000.00			
1 bill clerk	1,000.00			
1 assistant clerk	1,000.00			
In yard pay office:				
1 writer	1,017.25			
Total		8,857.25		
Navy-yard, Norfolk, Va. (same act):				
In general storehouses—				
2 bookkeepers, at $1,200 each	$2,400.00			
2 assistant bookkeepers, at $1,017.25 each	2,034.50			
1 bill clerk	1,000.00			
1 assistant bill clerk	720.00			
1 receiving clerk	942.00			
1 assistant receiving clerk	720.00			
In yard pay office—				
1 writer	1,017.25			
Total		$8,833.75		
Total			$67,581.09	$67,532.08
CONTINGENT.				
For freight and express charges, candles, fuel, books and blanks, stationery, advertising, furniture for general storehouses and pay offices in navy-yards, expenses of naval clothing factory and machinery for same, postage, telegrams, telephones, tolls, ferriages, yeoman's stores, iron safes, newspapers, ice, and other incidental expenses (act July 26, 1894)		45,000.00	45,000.00	45,000.00

APPENDIX A.

GENERAL NAVAL ACCOUNT FOR THE FISCAL YEAR ENDING JUNE 30, 1894.

Appropriations.

DEBITS.

Balances July 1, 1893		$17,412,762.49
Appropriations for fiscal year 1894:		
Act of March 3, 1893	$21,394,246.38	
Deficiency act of March 3, 1893	2,253.15	
Act of March 9, 1894	45,000.00	
Urgent deficiency act of April 21, 1894	40,000.00	
		21,481,499.53
Overdrawn appropriations covered by warrant		20,306.01
Interest on Navy pension fund		420,000.00
Covered in to the credit of the following funds:		
Clothing and small stores fund	$350,159.66	
Ordnance materials, proceeds of sales	55,595.25	
Naval Hospital fund	85,613.32	
Pay of the Navy, deposit fund	181,467.97	
Pay, miscellaneous, 1894	22,998.06	
Sale of small arms	15.38	
		695,849.64
Refunded by disbursing officers and others		1,044,485.94
Transfers between appropriations by warrant		274,215.00
Total		41,349,118.61

CREDITS.

Charged to account of appropriations		$32,778,845.49
Charged to overdrawn appropriations	$20,588.51	
Refunded to overdrawn appropriations	282.50	
		20,306.01
Transfers between appropriations by warrant		205,000.00
Navy pension fund		420,000.00
Surplus fund, 1894		305,637.68
Balance on hand June 30, 1894, to next account		7,619,329.43
Total		41,349,118.61

Balances June 30, 1894.

Annual appropriations—		
1894	$2,034,720.05	
1893	327,747.71	
1892	246,178.62	
1891	354.20	
1889	146.83	
1888	138.73	
		$2,609,286.14
Increase of the Navy:		
Vessels for coast and harbor defense	494.54	
Construction and machinery	26,141.84	
Traveling cranes	33,464.79	
Equipment	364,549.04	
Armor and armament	368,583.26	
Rapid twist guns and reinforce cartridges	22,299.83	
Armor and gun steel	222,299.05	
Gun plant, navy-yard, Washington, D. C	1,851.50	
Nickel	292,413.32	
Submarine torpedo boat	198,828.52	
		1,530,925.69

Funds as follows:		
Pay of the Navy, deposit fund	$217,042.74	
Payment of Japanese award	29,992.35	
Bounty, destruction of enemies' vessels, act of July 7, 1884	54,653.05	
Prize money	454,532.91	
Navy pension fund	420,000.00	
Naval hospital fund	309,345.28	
Clothing and small stores fund	173,952.39	
Naval supply fund	181,578.64	
		$1,791,097.36
Continued appropriations for public works		1,688,020.24
Total balance as above		7,619,329.43

Requisitions drawn by the Navy Department during fiscal year 1894.

Charged to current appropriations	$32,778,845.49	
Overdrawn appropriations	20,588.51	
General account of advances	5,619,114.59	
		$38,418,548.59
Deduct adjustments and Department settlements		6,993,224.94
Total amount advanced		31,425,323.65

ANALYSIS OF ADVANCES.

By the Navy Department:		
Advanced to the Navy agents, London	$1,100,000.00	
Direct payments through Department	128,376.86	
Bills of exchange drawn by pay officers of ships	235,545.70	
		1,463,922.56
Through the Paymaster-General:		
To disbursing officers to pay vouchers	16,169,427.89	
To disbursing officers to pay labor rolls at navy-yards	5,369,323.45	
To disbursing officers to pay navy-yard rolls	3,644,021.30	
To pay officers of ships in commission	4,018,948.00	
To pay officers of the Marine Corps	758,156.85	
Advances to Navy pay office, Washington, D. C	1,000.00	
Advandes to other pay officers	523.60	
		29,961,401.09
Total advances as above		31,425,323.65

Statement of receipts and payments for fiscal year ending June 30, 1894.

RECEIPTS.

Balance of account July 1, 1893		$18,100,823.09
Appropriations for fiscal year 1894. (*See* appropriations)		*21,481,499.53
Overdrawn appropriations for fiscal year 1894		20,306.01
Interest on Navy pension fund (3 per cent on $14,000,000)		420,000.00
Sundry minor receipts, as follows:		
Cash from sales of supplies	$72,595.34	
Cash from sales of condemned stores	46,505.21	
Refunded, rents, etc	16,326.35	
Collected from contractors in default	4,821.66	
Undrawn pensions from pensioners at Naval Home	13,551.64	
Premiums received on bills of exchange	23,776.97	
Interest paid by Navy agents, Londoh	1,183.02	

Sundry minor receipts, as follows—Continued.		
Checked by Fourth Auditor and paid	$38.63	
Damages to vessels collected	442.84	
Purchase of discharge by seamen	1,582.45	
Cash from sales of deserters and deceased men's effects	2,676.41	
Adjusted accounts	529.25	
		$184,029.77
Total		40,206,658.40

PAYMENTS.

Secretary of the Interior to pay Navy pensions	$350,785.00
Payments to the surplus fund, 1894	305,637.68
To the U. S. Treasury as miscellaneous receipts	36,877.37
Expenses of sales of condemned stores	3,135.94
For account of the Naval Establishment	31,370,144.91
Balance June 30, 1894, to next account	8,140,077.50
Total	40,206,658.40

Statement of assets and liabilities.

ASSETS.

Appropriations, balance undrawn		$7,619,329.43
Advances to disbursing officers, not credited:		
To Navy pay agencies	$21,102.85	
To Navy-yards and stations	200.00	
To Navy pay agencies, account of Navy Department	151.80	
To Pay officers of ships	55,000.00	
		76,454.65
Balances in hand, as follows:		
Quartermaster of the Marine Corps	26.73	
Paymaster of the Marine Corps	17,444.22	
Navy pay officers	25,388.54	
Pay officers of navy-yards and stations for labor rolls	73,242.92	
Disbursing officers, pay of the Navy	171,723.41	
Navy pay agents, London	91,428.97	
Pay officers of ships	677,356.01	
Naval attachés, abroad	2,601.37	
		1,059,212.17
Payments to seamen for deposits, not adjusted by Auditor		55,981.14
Deposits in the Treasury, not adjusted by Auditor		68,560.60
Transfers between pay officers charged, not credited		11,918.84
Total assets		8,891,456.83

LIABILITIES.

General account of advances	$378,168.22
Credited by disbursing officer, advanced in July	860.00
Bills of exchange, credited and not paid	82,221.70
Deposits by seamen on interest, adjusted by Auditor	217,042.74
Deposits by seamen on interest, not adjusted by Auditor	35,958.00
Transfers between pay officers received, not charged	11,986.29
Vouchers, not reported as paid	25,142.38
Balance as per account, receipts and payments	8,140,077.50
Total	8,891,456.83

Analysis of payments for account of the Naval Establishment.

Labor rolls at navy-yards and naval stations:		
Bureau of Yards and Docks	$543, 886. 72	
Bureau of Equipment	340, 915. 94	
Bureau of Navigation	165, 495. 94	
Bureau of Ordnance	1, 028, 337. 72	
Bureau of Construction and Repair	2, 116, 244. 21	
Bureau of Steam Engineering	881, 872. 94	
Bureau of Supplies and Accounts	233, 068. 56	
Bureau of Medicine and Surgery	38, 124. 57	
On account of the Navy Department	199. 91	
		$5, 348, 146, 51
Approved money vouchers:		
Bureau of Yards and Docks	880, 011. 19	
Bureau of Equipment	607, 457. 64	
Bureau of Navigation	146, 563. 12	
Bureau of Ordnance	6, 346, 684. 84	
Bureau of Construction and Repair	500, 955. 64	
Bureau of Steam Engineering	333, 956. 11	
Bureau of Supplies and Accounts	7, 167, 276. 25	
Bureau of Medicine and Surgery	156, 904. 22	
On account of the Navy Department	56, 365. 40	
		16, 196, 174. 41
Direct payments:		
By the Navy Department	94, 691. 86	
By the Navy agents, London	10,518. 58	
By the naval attachés abroad	21, 510. 44	
		126, 720. 88
Pay rolls of navy-yards and naval stations		2, 763, 015. 60
Payments by Navy pay agents		813, 318. 60
Payments on account of the Marine Corps:		
By the quartermaster	247, 453. 92	
By the paymaster	486, 241. 77	
By the assistant quartermaster, Philadelphia	13, 400. 00	
		747, 095. 69
Ship's bills: Supplies purchased at sea, etc		884, 201. 07
Payments on rolls of ships in commission		4, 458, 488. 47
Minor payments		32, 983. 68
Total		31, 370, 144. 91

Statement of receipts and expenditures for fiscal year ending June 30, 1894.

DEBITS.

Balances due June 30, 1893, and included in payments for 1894:		
Rolls of ships in commission	$592, 092. 69	
Rolls of navy-yards and naval stations	26, 783. 69	
		$618, 876. 38
Overpayments June 30, 1894, to be accounted for in 1895:		
Rolls of ships in commission	15, 194. 53	
Rolls of navy-yards and naval stations	85. 07	
		15, 279. 60
Overpayments transferred in transit		2, 030. 20
Advances to officers, not reported as credited		3, 143. 58
Total expenditures for fiscal year 1894		31, 888, 751. 71
Total		32, 528, 081. 47

CREDITS.

Overpayments July 1, 1893, brought forward:		
Rolls of ships in commission	14, 712. 85	
Rolls of navy-yards and naval stations	20. 96	
		14, 733. 81
Credited to funds:		
Clothing and small-stores fund	317, 330. 28	
Naval hospital fund	42, 348. 12	
		359, 678. 40

Pay and commuted rations forfeited by seamen:		
Court-martial	$18,446.47	
Absence	7,414.39	
Desertion	23,456.58	
		$49,317.44
Checked by order of Fourth Auditor		8,197.51
Due deceased men, transferred to Fourth Auditor		7,761.66
Purchase of discharge by seamen, checked on rolls		2,112.63
Clothing overdrawn by marines		4,343.86
Retained pay, marines, first year's service		1,315.73
Allotments checked, not reported paid		1,406.50
Transferred accounts in transit		21,592.40
Balance due on rolls June 30, 1894:		
Rolls of ships in commission	670,090.43	
Rolls of navy-yards and naval stations	17,386,19	
		687,476.62
Balance, payments on account of the Naval Establishment		31,370,144.91
Total		32,528,081.47

Analysis of expenditures for the fiscal year ending June 30, 1894.

C.—Costs of commission of ships in naval service:			
Pay of officers and seamen		$3,824,923.19	
Pay of marines		194,481.89	
Commuted rations		618,865.00	
Miscellaneous expenses		104,300.24	
			$4,742,570.32
G.—Maintenance of navy-yards and naval stations:			
Portsmouth, N. H		72,896.32	
Boston, Mass		104,928.88	
Naval torpedo station, Newport, R.I. (nine months)		30,538.28	
Naval training station, Newport, R. I. (nine months)		1,036.74	
Naval station, Newport, R. I. (three months)		12,383.31	
Naval station, New London, Conn		14,273.42	
New York, N. Y		266,122.51	
League Island, Pa		75,083.43	
Baltimore, Navy pay office		7,393.15	
Naval Academy, Annapolis, Md		255,767.02	
Washington, D. C		106,683.92	
Norfolk, Va		118,344.21	
Port Royal, S. C		18,257.80	
Key West, Fla		10,605.66	
Pensacola, Fla		18,465.54	
Mare Island, Cal		104,281.92	
Puget Sound, Wash		11,967.73	
Sacketts Harbor, N. Y		401.00	
Erie, Pa. (rent of dock)		548.00	
Hydrographic Office		7,918.14	
Naval Home, Philadelphia, Pa		83,145.17	
Money vouchers	$261,553.18		
Navy-yard rolls and payments by Navy pay agents	1,059,488.97		
			1,321,042.15
G.—Naval hospital, Yokohama		8,085.86	
Coaling station, Honolulu		4,594.79	
Coaling station, Pichelinque, Mexico		240.00	
Coaling station, Pago Pago, Samoa		646.25	
			13,566.90
H.—Pay of officers of the Navy on leave or waiting orders		201,384.94	
Pay of officers of the Navy on the retired list		880,946.27	
Pay and commuted rations, recruits awaiting draft and discharge		430,238.81	
			1,512,570.02
M.—Pay and commuted rations, Fish Commission		71,802.56	
K.—Pay and commuted rations, Coast Survey vessels		198,446.27	
			270,248.83

Pay of officers while traveling under orders		$51,506.79
-Pay of officers Light-House Service		67,445.10
-Pay and commuted rations, sick in hospital		5,958.25
ments for the Marine Corps at navy-yards and stations		747,095.69
or rolls at navy-yards and naval stations		5,348,146.51
roved money vouchers:		
A.—Cost and valuation of ships	$8,251,072.32	
B.—Equipage	17,729.12	
D.—Repairs of vessels	5,119.13	
E.—Real estate and chattels	579,952.32	
F.—Machinery plant	6,245.00	
N.—Experiments	35,283.10	
Z.—Conversion account	6,009.34	
X.—Supplies purchased at navy-yards and stations	6,894,836.92	
		15,796,247.25
airs, ships in commission, paid on ships' bills:		
Bureau of Equipment	521.02	
Bureau of Ordnance	262.84	
Bureau of Construction and Repair	7,010.39	
Bureau of Steam Engineering	9,015.15	
		16,809.40
plies purchased by ships in commission, paid on ip's bills:		
Bureau of Equipment	504,849.26	
Bureau of Ordnance	2,386.46	
Bureau of Construction and Repair	27,158.90	
Bureau of Steam Engineering	76,843.64	
Bureau of Supplies and Accounts, provisions, etc.	132,308.33	
		743,546.59
Pay of officers of the Navy on special duty:		
Navy Department, chiefs of bureau and officers on duty	197,101.10	
Hydrographic duty	29,863.42	
Naval Observatory	29,245.62	
Nautical Almanac	10,500.00	
Smithsonian Institution	3,070.69	
Naval dispensary, museum of hygiene	15,825.61	
Naval proving ground	10,001.08	
Furlough	1,243.53	
Boards, etc.:		
Inspection and survey at navy-yards	27,026.29	
Naval examining board of engineers	8,723.28	
Naval examining boards, Washington and Mare Island	32,095.35	
Medical examining board	10,937.63	
Board of improvement, New York	3,500.00	
Inspector of pay corps and clerk	5,300.00	
Court-martial duty	821.33	
Inspection duty:		
Inspection of steel	32,916.71	
Inspection of ordnance	7,958.54	
Inspection of merchant vessels	2,263.02	
Thurlow, Pa	2,989.58	
Bath Iron Works	6,672.05	
Cramp's shipyard, Philadelphia, Pa	14,542.71	
Quintard Iron Works, New York	10,239.45	
Homestead Steel Works	2,889.90	
Columbian Iron Works, Baltimore, Md	6,338.09	
Richmond Locomotive Works	1,213.15	
Atlantic Iron Works	1,050.41	
U. S. S. *Katahdin*	1,339.73	
U. S. S. *Columbia*	4,229.58	
U. S. S. *Ericsson*	2,415.34	
U. S. S. *Montgomery*	4,596.69	
U. S. S. *Castine*	1,356.16	
U. S. S. *Olympia*	8,153.44	
U. S. S. *Oregon*	9,119.73	
U. S. S. *New York*	670.96	

I.—Pay of officers of the Navy on special duty—Cont'd.		
Inspection duty—Continued.		
U. S. S. *Detroit*	$147.95	
U. S. S. *Marblehead*	484.92	
U. S. S. gunboats Nos. 7, 8, and 9	2,180.82	
Other special duty:		
School-ship *Enterprise*	13,224.28	
School-ship *Saratoga*	10,320.24	
School-ship *St. Marys*	9,711.43	
Instruction abroad	9,112.32	
Supervisor of New York Harbor	5,007.13	
Port Royal, S. C	2,653.91	
Fort Mifflin and Dover	1,740.26	
Torpedo station	1,131.52	
Medical attendance, sick, New York and Philadelphia	6,560.01	
Marine rendezvous	6,285.47	
World's Columbian Exposition	14,253.44	
Inspectors of electric lights	3,465.48	
Instructors at colleges	5,096.99	
Superintendence, State, War and Navy building	6,400.00	
Superintendence, Army and Navy Hospital, Hot Springs	1,030.14	
Intercontinental railroad survey	2,400.00	
Howell torpedo	1,497.27	
Fish Commission	2,197.27	
Marine-Hospital Service	604.93	
Dry dock, Algiers, La	795.89	
Orders of Department	9,880.84	
Total, pay of officers, special duty		$622,392.6
Sundry naval expenses:		
Cost of outfits for apprentices	25,336.34	
Honorable discharge certificates to seamen	82,732.00	
Interest paid on deposits by seamen	8,479.73	
International naval review	10,861.61	
Bureau expenses	17,754.32	
Advertising	12,934.40	
Freights	110,653.20	
Repairs to nautical instruments	4,522.52	
Naval militia	16,305.38	
Transportation of men	19,475.29	
Repairs to marine barracks, Mare Island	1,650.88	
Expenses, Navy agents, London	8,032.33	
Expenses of prisoners	6,359.63	
Survey for dry dock, Algiers, La	734.90	
Expenses, Board of Visitors, Naval Academy	904.48	
Discount on silver depreciation	9,054.52	
Discount on bills of exchange	9,289.25	
Expenses, special instruction of students abroad	4,089.41	
Expenses, Naval Attachés abroad	17,546.91	
Books and periodicals	2,128.68	
Expenses, dispatch agent, London	2,815.11	
Charts, Hydrographic Office	4,353.78	
Reclaiming wreck of U. S. S. *Kearsarge*	8,500.00	
Miscellaneous expenses	22,475.68	
Repairs to cemetery at Cape de Verde Islands	163.71	
Minor expenses, World's Columbian Exposition	306.80	
		407,460.86
Miscellaneous payments and certified claims:		
Fourth Auditor's certificates	48,463.00	
Fourth Auditor's certificates, certified claims	10,136.72	
Mileage	131,078.90	
Prize money	1,865.30	
Extra pay to officers and men who served in the war with Mexico	2,696.50	
Enlistment bounties to seamen	374.23	
Bounty, destruction of enemies' vessels, act July 7, 1884	439.03	

Miscellaneous payments and certified claims—Cont'd.		
Lieut. F. F. Fletcher, for patent process	$390.00	
Relief of Rodman M. Price	7,900.00	
Indemnity for lost clothing	10,333.71	
Relief of sufferers by wreck at Samoan Islands	272.77	
Payment of Japanese award	714 37	
Minor credits on rolls of ships in commission	7,479.84	
		$222,144.37
Total expenditures, 1894		31,888,751.71

APPENDIX B.

Statement of receipts and expenditures of provisions, fiscal year 1894.

RECEIPTS.

Balances July 1, 1893:		
On hand at navy-yards and stations	$102,763.05	
On board ships in commission	63,223.32	
Provisions in transit	524.35	
		$166,510.72
Receipts at navy-yards and stations:		
Purchases	148,019.25	
Gain on issues	198.46	
From World's Columbian Exposition	15.85	
From coffee mill (roasted and ground coffee)	22,340.96	
		170,574.52
Receipts on board ships:		
Purchases	129,267.73	
Gain on issues	14,150.76	
From other departments	96.80	
		143,515.29
Total		480,600.53

EXPENDITURES.

Expenditures at navy-yards and stations:		
For use (expense account)	54.37	
Water to navy-yard tugs (cooking and drinking)	27.43	
To other departments	18.32	
Condemned by surveys to loss account	2,251.42	
Condemned by surveys to be sold at auction	4,582.69	
Loss on issues	8.22	
To coffee mill (green coffee)	22,340.96	
Transfer to general storekeeper (1893)	1,256.31	
		30.539.72
Expenditures on board ships:		
Issues to crew	199,149.53	
Issues to marines	30,457.20	
Issues to supernumeraries not entitled to pay	319.36	
Water for cooking and drinking purposes	2,947.32	
To other departments	174.33	
Sales to messes for cash	16,507.33	
Condemned by surveys to loss account	1,794.61	
Loss on issues	6,011.94	
Loss by wreck of U. S. S. *Kearsarge*	1,556.67	
		258,918.29
Balances July 1, 1894:		
On hand at navy-yards and stations	123,615.42	
On board ships in commission	62,927.99	
Provisions in transit	4,599.11	
		191,142.52
Total		480,600.53

Provisions in transit June 30, 1894.

EXPENDITURES.

Fourth quarter, 1894:	
From A. W. Bacon, general storekeeper, navy-yard, Mare Island, Cal.—	
To Paymaster H. R. Smith, U. S. S. *Concord*	$384.15
To Paymaster Geo. E. Hendee, U. S. S. *Philadelphia*	357.70
From Rufus Parks, general storekeeper, navy-yard, New York—	
To Paymaster J. Q. Lovell, U. S. S. *Portsmouth*	25.69
To Paymaster E. B. Rogers, U. S. S. *Cincinnati*	3.56
To Paymaster J. H. Chapman, U. S. S. *Marblehead*	13.45
To Paymaster I. G. Hobbs, U. S. torpedo boat *Stiletto*	.06
To Paymaster O. C. Tiffany, U. S. R. S. *Vermont*	5.01
To Paymaster L. Hunt, U. S. Coast-Survey vessels	.43
To R. P. Lisle, general storekeeper, navy-yard, Norfolk, Va	3,809.06
Total	4,599.11

Clothing and small-stores fund account.

RECEIPTS.

Clothing and small-stores fund, July 1, 1893		$1,133,071.43
Accounts receivable subject to settlement by the Fourth Auditor	$330,620.61	
Accounts receivable from the State Department	201.58	
		330,822.19
Clothing and small stores purchased:		
Purchased at navy-yards and stations	357,452.66	
Purchased by pay officers on ships	2,941.71	
Pay roll at clothing factory (manufacturing)	42,748.33	
		403,142.70
Gains:		
Profit and loss	3,076.25	
Gain on average prices	1,445.89	
Gain by 5 per cent addition to invoice prices	15,612.13	
Gain by revaluation by surveys	989.10	
		21,123.37
		1,888,159.69

EXPENDITURES.

Payments made for purchases in 1894	404,102.84	
Less due for purchases in 1893	19,890.99	
		384,211.85
Due for purchases made in 1894		18,930.85
		403,142.70
Clothing and small stores expended:		
Issued to officers and crews	284,927.22	
Issued to marines	9,744.57	
Clothing outfits to apprentices as bounty	25,387.93	
Sold to other departments	5,515.43	
Sold for cash	5,045.46	
Issued to supernumeraries not entitled to pay	201.58	
		330,822.19
Losses:		
Expense account	100.40	
Loss by sales at public auction	30,820.71	
Loss on exhibit at World's Columbian Exposition	19.44	
Loss by wreck of U. S. S. *Kearsarge*	3,236.35	
Loss on issues	839.29	
		35,016.19
Clothing and small-stores fund, July 1, 1894		1,119,178.61
		1,888,159.69

Statement of the clothing and small-stores fund for the fiscal year ending June 30, 1894.

ASSETS.

Cash accounts:		
Balance in Treasury to credit of fund	$173,952.39	
Balance in hand of paymaster at navy-yard, New York	830.90	
		$174,783.29
Stock accounts:		
On hand at navy-yards and stations	466,755.94	
On hand at clothing factory	10,585.82	
On hand condemned to be sold	12,530.43	
On board ships in commission	274,064.11	
Stores in transit	42,765.51	
		806.701.81
Accounts receivable:		
For issues and sales awaiting adjustment by the Fourth Auditor	156,422.78	
For issues to destitute American seamen, reimbursement by State Department	201.58	
		156,624.36
Total assets		1,138,109.46

LIABILITIES.

Due for unpaid bills for stores delivered	13,421.91	
Due for reservations unpaid	4,935.12	
Due for unpaid ships' bills	573.82	
Total liabilities		18,930.85
Clothing and small-stores fund, June 30, 1894		1,119.178,61
		1,138,109.46

Statement of purchases and payments.

PURCHASES.

Due for clothing and small stores, July 1, 1893:		
At navy-yards and stations	$19,730.10	
On board ships	160.89	
		$19,890.99
Due for purchases in fiscal year 1894:		
At navy-yards and stations	357,452.66	
On board ships	2,941.71	
		360,394.37
Total purchases		380,285.36

PAYMENTS.

Payments made for clothing and small stores during the fiscal year 1894:		
At navy-yards and stations	358,825.73	
On board ships	2,528.78	
		361,354.51
Balance due on clothing and small stores:		
At navy-yards and stations	18,357.03	
On board ships	573.82	
		18,930.85
Total payments		380,285.36

Clothing and small stores in transit, June 30, 1894.

EXPENDITURES.

Second quarter, 1894:		
From Rufus Parks, general storekeeper, navy-yard, New York—		
To Paymaster Joseph Foster, U. S. S. *San Francisco*		$123.28
Fourth quarter, 1894:		
From W. Goldsborough, general storekeeper, U. S. Naval Academy, Annapolis, Md.—		
To Paymaster James Fulton, U. S. Naval Academy vessels		14.11
From A. W. Bacon, general storekeeper, navy-yard, Mare Island, Cal.—		
To Paymaster R. T. M. Ball, U. S. S. *Petrel*	$4,140.41	
Do	41.60	
		4,182.01
To Paymaster J. R. Stanton, U. S. S. *Mohican*		104.55
To Paymaster E. B. Webster, U. S. S. *Yorktown*		9.90
To Paymaster Geo. E. Hendee, U. S. S. *Philadelphia*		806.04
To Paymaster T. S. Jewett, U. S. S. *Pinta*		116.64
From Rufus Parks, general storekeeper, navy-yard, New York—		
To Paymaster A. S. Kenny, U. S. S. *Chicago*		3,136.04
To A. W. Bacon, general storekeeper, navy-yard, Mare Island, Cal	$183.40	
Do	27,509.67	
		27,693.07
To Edwin Putnam, general storekeeper, navy-yard, Boston, Mass		2,883.62
To R. P. Lisle, general storekeeper, navy-yard, Norfolk, Va		3,696.25
Total		42,765.51

Statement of receipts and expenditures of contingent stores, fiscal year 1894.

RECEIPTS.

Balances July 1, 1893:		
On hand at navy-yards and stations	12,435.30	
On board ships in commission	14,741.28	
Contingent stores in transit	475.11	
		27,651.69
Receipts at navy-yards and stations:		
Purchases	28,433.40	
From other departments	99.21	
Gain from revaluation by surveys	231.10	
From World's Columbian Exposition	178.10	
		28,941.81
Receipts on board ships:		
Purchases	918.02	
Gain on issues	525.14	
From other departments	123.90	
		1,567.06
Total		58,160.56

EXPENDITURES.

Expenditures at navy-yards and stations:		
For use (expense account)	20,241.10	
To other departments	456.22	
Condemned by surveys to loss account	2,299.59	
Condemned to be sold at auction	1,059.93	
Loss on issues	3.99	
		24,060.83

Expenditures on board ships:		
Issues to ships' use	$6,091.00	
To other departments	274.64	
Sales for cash	9.00	
Condemned by surveys to loss account	130.84	
Loss on issues	30	
Loss by wreck of U. S. S. *Kearsarge*	273.12	
		$6,778.90
Balances July 1, 1894:		
On hand at navy-yard and stations	12,369.57	
On board ships in commission	14,282.38	
Contingent stores in transit	668.88	
		27,320.83
Total		58,160.56

Contingent stores in transit, June 30, 1894.

EXPENDITURES.

Third quarter, 1894:		
From Rufus Parks, general storekeeper, navy-yard, New York—		
To W. W. Woodhull, general storekeeper, navy-yard, League Island, Pa		$21.05
Fourth quarter, 1894:		
From R. P. Lisle, general storekeeper, navy-yard, Norfolk, Va.—		
To Paymaster John Corwine, U. S. S. *Raleigh*	$1.15	
Do	4.50	
		5.65
From A. W. Bacon, general storekeeper, navy-yard, Mare Island, Cal.—		
To paymaster E. B. Webster, U. S. S. *Yorktown*		45.24
From Rufus Parks, general storekeeper, navy-yard, New York—		
To R. P. Lisle, general storekeeper, navy-yard, Norfolk, Va.		596.94
Total		668.88

APPENDIX C.

Statement of expenditures of money and material at shore stations, and objects to which applied, during the fiscal year ending June 30, 1894.

TITLE A.—COST OF CONSTRUCTION OF SHIPS.

Vessels.	Money vouchers.	Labor.	Material.	Total.
Newark		$249.39		$249.39
Maine	$100,305.28	157,536.72	$639,591.64	897,433.64
Texas	20,543.51	217,085.65	266,335.27	503,964.43
Puritan	6,402.11	82,852.88	488,176.09	577,431.08
Monadnock	306,083.27	249,052.85	76,478.15	631,614.27
Amphitrite	41,941.86	111,845.41	223,008.56	376,795.83
Terror	28,997.76	87,817.31	259,633.37	376,448.44
Indiana	1,109,809.66	10,587.22		1,120,396.88
Massachusetts	494,127.18	10,038.55		504,165.73
Oregon	794,596.95	13,351.75		807,948.70
Concord		1,204.31		1,204.31
Bennington		1,187.37		1,187.37
Monterey	118,005.89	10,299.56	674.73	128,980.18
New York	338,918.46	23,621.74	4,744.28	367,284.48
Olympia	821,618.17	7,403.36		829,021.53
Cincinnati		337,022.02	99,941.05	436,963.07
Raleigh		202,029.30	64,162.48	266,191.78
Montgomery	354,517.54	39,098.61	6,985.58	400,601.73
Detroit	308,365.45	21,761.31	3,004.63	333,131.39
Marblehead	262,787.39	50,008.53	5,131.12	317,927.04
Bancroft	8,545.76	1,817.90	183.54	10,547.20
Ericsson	19,350.00	2,502.86		21,852.86
Columbia	1,101,347.75	14,779.60	12.96	1,116,140.31
Machias	29,570.84	27,689.27	3,221.41	60,481.52
Castine	69,966.45	25,585.55	4,186.10	99,738.10
Katahdin	131,484.31	7,004.05	389,949.15	528,437.51
Minneapolis	364,937.66	9,929.77		374,867.43
Brooklyn	847,722.78	4,198.84		851,921.62
Iowa	571,126.29	7,014.94		578,141.23
Gunboat No. 7		10,909.41	19.15	10,928.56
Gunboat No. 8		7,764.70	.17	7,764.87
Gunboat No. 9		10,162.40		10,162.40
Total	8,251,072.32	1,763,413.13	2,535,439.43	12,549,924.88

TITLE B.—EQUIPAGE OF SHIPS.

Maine	$5,613.84	$4,652.21	$132.62	$10,398.67
Texas	715.96	2,264.00	149.01	3,128.97
Puritan		692.47	39.66	732.13
Monadnock		113.72		113.72
Amphitrite		1,159.67	23.78	1,183.45
Terror		852.99	22.40	875.39
Monterey		1,323.08	12.19	1,335.27
New York	5,170.01	6,415.14	664.93	12,250.08
Olympia		107.72		107.72
Cincinnati	715.96	4,872.95	384.69	5,973.60
Raleigh	715.97	2,638.32	11,396.16	14,750.45
Montgomery	1,414.98	1,941.09	25.23	3,381.30
Detroit	1,393.49	771.95	228.49	2,393.93
Marblehead	104.00	2,690.00	294.41	3,088.41
Machias	842.14	336.62		1,178.76
Castine	767.77	354.44	13.48	1,135.69
Oregon		218.44		218.44
Columbia	275.00	121.72	1.12	397.84
Minneapolis		80.16		80.16
Essex		784.66		784.66
Total	17,729.12	32,391.35	13,388.17	63,508.64

of expenditures of money and material at shore stations, etc.—Continued.

TITLE D.—REPAIRS OF SHIPS.

	Money vouchers.	Labor.	Material.	Total.
		$15,230.60	$7,150.67	$22,381.36
	$233.60	1,099.30	1,064.66	2,397.65
	195.00	5,804.34	4,360.45	10,359.79
	500.00	35,084.23	9,287.57	44,871.80
	95.05	3,579.66	954.82	4,629.53
	12.71	3,075.54	510.56	3,598.81
	16.00	64.69	4,847.47	4,928.16
		1,706.71	1,291.64	2,998.35
		8.03	247.46	255.49
		9,156.84	4,200.14	13,356.98
	592.50	7,057.44	2,156.49	9,806.43
		15,892.58	5,690.97	21,583.55
		91.90	513.20	605.10
		5,807.40	3,310.34	9,117.74
		10.09		10.09
		469.19	349.64	818.83
		560.52	724.15	1,284.67
		1,375.45	659.26	2,034.71
		956.52	455.43	1,411.95
		760.31	55.12	815.43
	455.28		226.50	681.78
		50.88	.27	51.15
	1,278.00	110,517.47	30,981.66	142,777.13
		32,833.78	5,880.24	38,714.02
		92.98	28.43	121.41
		302.64	7.05	309.69
		78.30		78.30
		1.16		1.16
		1,153.41	326.81	1,480.22
		1,074.06	82.10	1,156.16
		1,624.04	120.98	1,745.02
		726.17	174.50	900.67
		1,917.54	294.87	2,212.41
		1,126.87	243.28	1,370.15
		9,906.19	2,706.58	12,612.77
	85.50	2,855.96	929.29	3,870.75
	126.65	10,334.50	3,642.76	14,103.91
			130.67	130.67
			32.80	32.80
	52.00	417.77		469.77
		25,494.70	7,461.71	32,956.41
	1,198.50			1,198.50
	166.50	4,248.80	1,068.95	5,484.25
		66,856.32	17,395.64	84,251.96
		6,733.76	1,668.78	8,402.54
		4,626.20	699.34	5,325.54
		224.19	267.75	491.94
		15,447.71	8,510.29	23,958.00
		47.00	42.30	89.30
		54,051.99	12,139.63	66,191.62
		241.00		241.00
		1,272.30	86.65	1,358.95
		386.12	2,405.29	2,791.41
		395.61	49.90	445.51
		2,472.64	583.95	3,056.59
		19,178.71	4,770.04	23,948.75
		11,811.88	1,415.94	13,227.82
	110.00	7,416.55	1,984.22	9,510.77
		23.75	23.55	47.30
		331.48	267.48	598.96
		125.00	47.82	172.82
		528.12	24.49	552.61
		2,747.92	623.60	3,371.52
		979.27	107.91	1,087.18
		39.34	18.55	57.89
	1.75	1,174.24		1,175.99
		3,865.00	419.29	4,284.29
	5,119.13	513,524.75	155,721.90	674,365.78

Statement of expenditures of money and material at shore stations, etc.—Continued.

TITLE E.—REAL ESTATE AND CHATTELS.

Navy-yards, etc.	Money vouchers.	Labor.	Material.	Total.
Navy-yard, Portsmouth, N. H	$6,229.44	$4,099.53	$2,663.93	$12,992.90
Navy-yard, Boston, Mass	490.00	1,784.82	1,976.30	4,251.12
Naval station, Newport, R. I		9,320.92	10,250.00	19,570.92
Navy-yard, Brooklyn, N. Y	107,356.02	45,417.78	37,727.91	190,502.31
Navy-yard, League Island, Pa	69,784.66	22,663.15	13,003.63	105,451.44
Naval Academy, Annapolis, Md	7,362.22	8,364.81	17,758.82	33,485.85
Navy-yard, Washington	8,440.35	20,159.53	44,432.78	73,032.66
Naval Observatory	13,329.90			13,329.90
Naval proving ground	4,977.85	8,388.90	21,574.52	34,941.27
Navy-yard, Norfolk, Va	11,313.02	33,276.25	24,974.37	69,563.64
Naval station, Port Royal, S. C	93,590.95	8,680.69	9,746.70	112,018.34
Navy-yard, Mare Island, Cal	46,278.63	26,391.89	16,803.22	89,473.74
Naval station, Puget Sound, Wash	210,798.68	10,559.46	889.37	222,247.51
Naval magazine, Dover, N. J		2,636.75		2,636.75
Total	579,952.32	201,744.48	201,807.55	983,504.35

TITLE F.—MACHINERY PLANT.

Navy-yard, Portsmouth, N. H.:				
Bureau of Construction and Repair		$15,982.26	$7,497.68	$23,479.94
Bureau of Steam Engineering		286.24	37.73	323.97
Navy-yard, Boston:				
Bureau of Yards and Docks			315.00	315.00
Bureau of Construction and Repair		16,181.47	4,229.31	20,410.78
Bureau of Steam Engineering			67.50	67.50
Naval Station, Newport:				
Bureau of Navigation			10,655.69	10,655.69
Bureau of Ordnance			7,447.42	7,447.42
Bureau of Steam Engineering			1,203.55	1,203.55
Navy-yard, New York:				
Bureau of Construction and Repair	$107.00	6,927.65	20,683.97	27,718.62
Bureau of Steam Engineering			17,750.41	17,750.41
Navy-yard, League Island:				
Bureau of Construction and Repair		2,476.92	11,577.10	14,054.02
Bureau of Steam Engineering		297.04	16,662.59	16,959.63
Naval Academy, Annapolis, Md.:				
Bureau of Navigation	6,138.00		4,032.74	10,170.74
Bureau of Steam Engineering			23.12	23.12
Navy-yard, Washington:				
Bureau of Ordnance			219,077.95	219,077.95
Naval proving ground:				
Bureau of Ordnance		2,576.37	628.01	3,204.38
Naval station, Port Royal, S. C.:				
Bureau of Yards and Docks			892.50	892.50
Navy-yard, Mare Island:				
Bureau of Steam Engineering			521.60	521.60
Bureau of Construction and Repair		18,623.03	59,498.52	78,121.55
Total	6,245.00	63,350.98	382,802.39	452,398.37

TITLE G.—GENERAL MAINTENANCE.

Navy-yard, Portsmouth, N. H	$521.67	$84,587.70	$18,218.85	$103,328.22
Navy-yard, Boston, Mass	18,058.68	123,349.35	57,032.04	198,440.07
Naval magazine, Chelsea, Mass	242.41			242.41
Niter depot, Malden, Mass	29.75			29.75
Naval station, Newport, R. I	4,334.77	73,818.12	42,781.86	120,934.75
Naval station, New London, Conn	1,154.62	8,580.10	2,062.51	11,797.23
Navy-yard, New York, N. Y	14,149.77	300,249.57	97,861.22	412,260.56
Navy-yard, League Island, Pa	5,991.89	108,008.15	29,585.99	143,586.03
Naval Home, Philadelphia, Pa	52,136.15	17,324.70		69,460.85
Naval Academy, Annapolis, Md	1,533.84	137,399.97	52,487.02	191,420.83
Naval Observatory, Washington, D. C	549.18			549.18
Navy-yard, Washington, D. C	3,081.11	190,062.61	86,626.01	279,769.73
Naval magazine, Bellevue, Md	55.00	1,474.51		1,529.51
Navy-yard, Norfolk, Va	6,225.86	141,521.93	57,401.52	205,149.31
Naval station, Port Royal, S. C	897.71	5,835.01	6,627.06	13,359.78
Naval station, Key West, Fla	356.16	8,371.08	815.26	9,542.50
Navy-yard, Pensacola, Fla	81.20	30,759.34	5,963.62	36,804.16
Navy-yard, Mare Island, Cal	6,920.06	183,010.54	69,350.68	259,281.28
Naval station, Puget Sound, Wash	429.50	4,308.33	802.27	5,540.10
Naval magazine, Dover, N. J		744.02		744.02

t of expenditures of money and material at shore stations, etc.—Continued.

Navy-yards, etc.	Money vouchers.	Labor.	Material.	Total.
ine, Craney Island, Va.	13.12			13.12
ıg ground, Indian Head, Md.	47.15	26,143.97	6,447.35	32,638.47
al, Widows Island, Me.	461.45	995.00		1,456.45
al, Portsmouth, N. H.	4,181.22	1,248.73		5,429.95
al, Chelsea, Mass.	11,589.51	4,435.55		16,025.06
al, New York, N. Y.	28,121.02	6,335.16		34,456.18
tory, New York, N. Y.	28,525.76	4,271.67		32,797.43
al, Philadelphia, Pa	15,345.77	3,260.90		18,606.67
al, Washington, D. C.	8,064.78	2,161.00		10,225.78
ıary, Washington, D. C.	1,481.63			1,481.63
ıygiene, Washington, D. C.	5,356.06	1,320.00		6,676.06
al, Norfolk, Va.	13,523.48	3,881.54		17,405.02
al, Pensacola, Fla	846.59	330.00		1,176.59
al, Mare Island, Cal.	18,317.39	4,667.52		22,984.91
rbor, N. Y	401.00			401.00
ice, Baltimore, Md.	61.78			61.78
	548.00			548.00
c Office, Washington, D. C	7,918.14			7,918.14
	261,553.18	1,478,456.07	534,063.26	2,274,072.51

TITLE V.—MISCELLANEOUS.

	$12,799.66			$12,799.66
g	5,400.14			5,400.14
	52,321.07			52,321.07
on of enlisted men	19,431.49			19,431.49
cpenses of bureaus	17,589.63			17,589.63
ationery, etc., for inspectors, urt-martial and investigation notary's fees, custom-house c	14,087.25			14,087.25
s		$181,501.51	$17,230.80	198,732.31
	121,629.24	181,501.51	17,230.80	320,361.55

TITLE Z.—CONVERSION ACCOUNT (FOR MANUFACTURE).

ards and Docks:				
rd, Washington		$157.30	$65.93	$223.23
uipment:				
rd, Portsmouth		1,390.39	3,665.66	5,056.05
rd, Boston		75,914.55	45,652.91	121,567.46
rd, New York		40,018.21	58,370.11	98,388.32
rd, Washington		1,422.57	307.16	1,729.73
rd, Norfolk		14,367.03	54,345.68	68,712.71
rd, Mare Island		22,863.09	67,513.93	90,377.02
rdnance:				
rd, Portsmouth		803.48	40,795.11	41,598.59
rd, Boston		11.40	331.90	343.30
station, Newport		6,150.17	4,907.99	11,058.16
rd, New York		13,307.32	132,765.89	146,073.21
rd, League Island		2,382.95	124,023.83	126,406.78
rd, Washington		615,392.35	2,154,326.02	2,769,718.37
rd, Norfolk		4,250.98	261,684.86	265,935.84
rd, Mare Island		5,134.99	329,538.26	334,673.25
onstruction and Repair:				
rd, Portsmouth		9,818.83	12,179.79	21,998.62
rd, Boston		72.16	29.55	101.71
rd, New York		58,618.38	43,441.42	102,059.80
rd, League Island		507.92	65.60	573.52
rd, Washington		11,022.54	745.53	11,768.07
rd, Norfolk		57,111.30	45,489.45	102,600.75
rd, Mare Island		19,989.48	28,271.16	48,260.64
eam Engineering:				
rd, Portsmouth		32,260.83	13,681.33	45,942.19
rd, Boston		23.48	5.99	23.42
rd, New York		39,591.99	28,655.29	68,927.28
rd, Norfolk		13,405.39	15,923.90	29,673.29
rd, Mare Island		4,160.85	6,772.17	10,934.02
upplies and Accounts:				
rd, New York	$6,009.34	42,748.34	94,878.45	143,636.13
	6,009.34	1,092,898.27	3,568,434.87	4,667,342.48

Statement of expenditures of money and material at shore stations, etc.—Continued.

RECAPITULATION.

Titles.	Money vouchers.	Labor.	Material.	Total
A.—Cost of construction of ships	$8,251,072.32	$1,763,413.13	$2,535,439.43	$12,549,924.88
B.—Equipage of ships	17,729.12	32,391.35	13,388.17	63,508.64
D.—Repairs of ships	5,119.13	513,524.75	155,721.90	674,365.78
E.—Real estate and chattels	579,952.32	201,744.48	201,807.55	983,504.35
F.—Machinery plant	6,245.00	63,350.98	382,802.39	452,398.37
G.—General maintenance	261,553.18	1,478,456.07	534,063.26	2,274,072.51
N.—Models and experiments	35,283.10	20,865.97	76,868.33	133,017.40
O.—Naval militia, arming and equipping	12,852.62	.....	52,902.90	15,360.74
V.—Miscellaneous	121,629.24	181,501.51	17,230.80	320,361.55
W.—Deterioration and waste (repairing instruments)	3,892.12	.....	.....	3,892.12
Z.—Conversion account (for manufacture)	6,009.34	1,092,898.27	3,568,434.87	4,667,342.48
Expended for specific objects, as above	9,301,337.49	5,348,146.51	7,538,659.60	22,188,143.60
Title X.—Supplies in store	6,894,836.92	.....	.....	6,894,836.92
Total	16,196,174.41	5,348,146.51	7,538,659.60	29,082,980.52

APPENDIX D.

Statement showing the value of real estate and chattels and machinery plant at the several navy-yards and stations June 30, 1894.

Navy-yards and stations.	Real estate and chattels.	Machinery plant.
Navy-yard, Portsmouth	$2,837,647.09	$304,176.34
Navy-yard, Boston	10,864,265.12	1,057,998.54
Naval station, Newport, R. I.	599,202.94	81,567.59
Naval station, New London, Conn	128,540.57	6,136.16
Navy-yard, New York	13,408,361.01	873,907.68
Navy-yard, League Island	2,955,891.68	207,104.57
Naval Academy, Annapolis	671,449.87	20,538.32
Navy-yard, Washington	4,467,742.11	2,066,945.86
Naval Observatory	615,536.12	.....
Naval Proving Ground	94,561.47	7,337.20
Navy-yard, Norfolk	5,749,003.73	574,500.18
Naval station, Port Royal	440,893.88	892.50
Naval station, Key West	299,298.05	8,291.55
Navy-yard, Pensacola	1,885,222.49	45,459.60
Navy-yard, Mare Island	4,915,377.47	352,553.13
Naval station, Puget Sound	276,699.84	.....
New naval magazine, Denver	72,974.28	.....
Total	50,282,667.72	5,607,437.62

APPENDIX E.

Compilation showing cost of maintaining all naval vessels in commission during year ending June 30, 1894, excepting medicine.

Vessels.	Money expended.										
	Pay of officers, crew, and marines.	Rations, amount commuted.	Special credits: Honorable-discharge money, outfits to apprentices, etc.	Incidental expenses: Postage, freight, pilotage, current repairs abroad, etc.							
				Equipment.	Navigation.	Ordnance.	Construction and Repair.	Steam Engineering.	Supplies and Accounts.	Medicine and Surgery.	Secretary's office.
Adams	$77,017.35	$16,100.40	$162.00	$100.46	$864.00	$14.00	$593.95	$66.90	$196.23	$37.20	$134.83
Albatross (Fish Commission)	38,340.95	7,056.60		1.91			225.00		2.47	2.50	48.86
Alert	35,076.50	5,132.40		45.00	108.00		41.34	2.31	41.54	13.85	128.27
Alliance	74,673.18	8,966.70	.50	176.96	347.69	4.55	29.60	2.95	420.55	392.51	2,145.27
Atlanta	33,804.29	5,049.30		221.25					13.15	14.41	5.56
Baltimore	171,620.07	22,161.90	1,616.97	408.89	33.03	32.38	2,175.37	844.21	172.17	255.00	4,107.53
Bancroft	4,049.93	626.70		45.50					1.57		
Bennington	95,835.74	12,068.70	1,185.00	433.94	104.88	3.99	539.11	3.58	193.02	346.07	471.55
Boston	49,052.73	9,530.40	387.00	1,449.89	305.10	3.65	90.56	19.55	3.30	59.98	114.40
Charleston	145,486.24	17,600.70	105.00	961.84	349.10	1.62	166.11	2.86	47.28	667.20	2,145.97
Chicago	188,718.84	23,354.40	3,192.00	1,325.92	797.99	13.12	1,404.97	3,129.20	225.15	894.91	2,336.85
Cincinnati	4,660.33	1,145.40									
Coast Survey vessels	168,015.32	30,389.40							17.61	180.35	31.32
Columbia				233.55	40.00				5.20	4.08	
Concord	92,433.15	9,399.90	789.00	259.95	171.89	2.86	1,572.76	2,876.62	81.04	344.11	1,980.28
Constellation	24,907.80	4,309.50		2.50	33.05	.50	16.10		4.65	3.35	9.09
Cushing	14,224.19	2,273.70	123.00	62.00							
Dale (receiving ship)	58,222.51	10,176.30	10,917.58		8.00				5.67	111.50	
Detroit	97,771.91	13,075.20		139.95	671.65		76.96		3.04	255.10	209.66
Dolphin	57,898.32	12,132.00	995.00	289.46						99.10	328.78
Essex	27,400.99	4,841.40	1,011.00	228.55	77.78				2.71	32.10	8.70
Fern	26,308.84	5,014.50	306.00								
Fish Hawk (Fish Commission)	21,609.84	4,574.10									
Franklin (receiving ship)	71,438.90	24,159.60	2,943.00		11.70					16.50	294.70
Independence (receiving ship)	62,934.66	30,479.70	12,814.15		2.75				1.40	15.50	128.34
Kearsarge	59,145.69	8,139.00	939.00	552.78	4,733.35				308.86	32.25	2,403.04
Lancaster	155,694.57	23,877.30	888.00	519.47	195.23	194.39	686.48	215.53	30.66	412.31	4,096.02
Leyden											
Machias	40,304.25	5,582.10		49.75						4.75	
Marblehead	24,841.43	3,533.10		43.00					10.59	68.31	3.42
Marion	95,401.22	12,024.00	1,782.00	740.55	76.41	1.88	702.40	325.35	56.55	457.40	322.65
Miantonomoh	78,620.58	8,413.50		225.06	288.00		26.25		4.87	27.10	34.68
Michigan	52,922.02	11,036.50	1,218.96	62.47	559.37	.40	511.10	6.05	13.11	16.21	208.01
Minnesota (receiving ship)	65,952.08	11,826.30	11,328.32	24.13	104.07	8.83	47.08	13.63	32.56	88.57	60.06
Mohican	89,919.05	17,600.40	210.00	1,200.55	367.50		9.86	92.06	64.47	97.75	78.42

Compilation showing cost of maintaining all naval vessels in commission during year ending June 30, 1894, excepting medicine—Continued.

Vessels.	Money expended.										
	Pay of officers, crew, and marines.	Rations, amount commuted.	Special credits: Honorable-discharge money, outfits to apprentices, etc.	Incidental expenses: Postage, freight, pilotage, current repairs abroad, etc.							
				Equipment.	Navigation.	Ordnance.	Construction and Repair.	Steam Engineering.	Supplies and Accounts.	Medicine and Surgery.	Secretary's office.
Monitors	33,423.54	7,610.10								3.00	4.00
Monocacy	69,546.06	12,094.20	2,088.00	3,799.94	59.47	18.17	900.92	163.56	51.59	504.36	1,720.52
Monongahela	68,596.68	11,552.10	486.00	212.08	1.25	.75	80	.15	21.42	65.24	114.60
Monterey	103,826.75	19,869.60	7.74	934.64			15.00	1.80		129.00	74.85
Montgomery	1,958.87	474.00									
Naval Academy vessels	52,518.53	10,210.90	144.00								
Newark	166,948.23	19,863.60	2,169.00	93.42	74.10	17.44	39.40	99.51	734.84	988.68	2,471.15
New York	189,832.20	28,029.50	933.00	1,256.23	188.17	3.24	12.69	55.63	44.81	439.62	1,159.79
Passaic											
Petrel	62,751.30	8,250.90	75.00	112.48	270.02	.68	1,705.29	975.89	26.97	300.80	165.50
Philadelphia	171,710.33	19,069.80	1,404.00	2,360.20	1,341.25	20.17	573.86	546.78	637.25	150.39	1,511.36
Pinta	37,994.90	6,177.60	768.00	1,713.58	268.00	9.58	169.46	299.68	99.68	96.09	683.84
Portsmouth	85,165.81	13,309.20	618.00	208.30	238.00					49.73	201.55
Raleigh	15,917.68	3,200.70									
Ranger	65,137.44	10,209.60	12.64	914.34	250.92	1.87	12.71		50.97	969.04	355.53
Richmond	148,733.39	52,854.30	8,789.44	.60	140.73	.57			41	633.17	
San Francisco	175,177.44	19,935.00	3,528.00	479.25	825.86	6.30	3.20	13.65	35.60	199.87	2,744.93
St. Louis (receiving ship)	46,617.26	10,777.40	7,429.81		20.00					5.79	13.80
Thetis	56,939.15	11,145.00	195.00	15.82	252.70			40.00	23.28	53.15	49.57
Vermont (receiving ship)	84,120.28	15,149.70	20,395.00	281.86	263.89			.75	4.00	118.04	103.61
Vesuvius	40,862.34	7,480.80	543.00								
Wabash (receiving ship)	73,407.89	19,030.50	5,195.03		17.75					36.00	
Wahneta	2,671.76	699.30									
Yantic	60,928.97	7,550.40	411.00	838.39	1,117.49	58.52	1,301.40	118.55	144.43	1,037.07	1,476.28
Yorktown	91,256.93	12,080.10	405.00	28.52	224.92	1.15	10.00	44.63	109.33	154.67	463.71
Total	$4,210,347.20	708,275.40	108,510.14	23,054.93	15,804.56	420.61	13,659.73	9,961.38	3,044.00	10,793.68	35,150.85

Compilation showing cost of maintaining all naval vessels in commission during year ending June 30, 1894, excepting medicine—Continued.

Vessels.	Value of stores expended.						Repairs at navy-yards while in commission.	Total.	Time in commission.
	Equipment	Navigation.	Ordnance.	Construction and Repair.	Steam Engineering.	Supplies and Accounts.			
									Mos.
Adams	$3,214.52	$34.93	$810.59	$630.61	$6,676.73	$1,975.62	.....	$108,630.32	12
Albatross (Fish Commission)	4,804.81	10.50	113.76	61.29	14,504.22	30.23	$815.43	66,018.53	12
Alert	3,461.44	98.12	404.10	1,209.41	7,976.20	1,900.42	84,251.96	139,800.86	6 5/10
Alliance	11,089.27	258.55	2,217.30	5,798.89	19,236.95	11,809.57	469.77	138,040.76	12
Atlanta	2,327.12	242.84	986.91	1,421.13	4,514.68	2,511.89	142,777.13	193,889.66	3 3/4
Baltimore	4,721.67	1,067.61	6,433.84	4,018 37	43,552.08	13,483.20	44,871.80	321,576.09	12
Bancroft	112.07	.80	479.89	15.81	127.39	162.41	818.83	6,440.90	1
Bennington	3,308.40	1,816.81	1,974.23	2,127.42	38,598.87	8,316.44	13,356.98	180,684.23	12
Boston	1,449.27	104.85	1,943.60	772.60	14,104.03	801.95	38,714.02	118,906.88	4 1/2
Charleston	5,183.39	863.07	8,544.17	4,104.44	52,019.30	14,042.77	2,397.65	249,708.71	12
Chicago	7,534.16	818.13	18,971.29	3,892.84	35,818.13	18,275.70	681.78	311,295.38	12
Cincinnati	.....	.....	.....	.....	.....	.....	.....	5,805.73	0 1/2
Coast Survey vessels	.....	.....	.....	.....	.....	234.15	.....	198,868.15	12
Columbia	1,159.26	11.01	2.92	601.23	2,850.57	.....	.....	4,907.82	3
Concord	3,410.78	799.70	4,314.20	2,587.85	23,168.64	6,903.30	255.49	151,351.52	12
Constellation	3,793.53	40.94	258.91	1,391.04	.....	1,072.89	13,227.82	49,671.67	2
Cushing	117.75	2.00	277.57	80.80	1,791.71	14	3,598.81	22,551.67	12
Dale (receiving ship)	1,268.33	8.18	104.37	28.39	.....	68.25	598.96	81,518.04	12
Detroit	4,276.81	86.06	3,791.48	2,656.64	25,817.32	9,759.57	9,117.74	167,709.09	12
Dolphin	1,836.11	218.48	1,922.28	1,277.28	7,879.65	124.51	14,103.91	99,104.88	12
Essex	1,023.91	64.88	1,408.01	380.15	1,210.23	2,180.77	32,956.41	72,827.59	5
Fern	1,368.63	31.69	46.56	151.45	1,492.25	128.69	5,325.54	40,174.15	12
Fish Hawk (Fish Commission)	.....	.....	.....	.....	.....	8.29	.....	26,192.23	12
Franklin (receiving ship)	2,280.25	.....	203.39	560.62	586.59	251.57	172.82	102,919.64	12
Independence (receiving ship)	5,032.22	11.89	269.90	588.36	95.37	244.02	445.51	113,063.77	12
Kearsarge	35,063.36	4,297.73	39,128.86	21,591.22	6,926.81	3,654.75	3,870.75	190,787.45	7 1/12
Lancaster	17,809.29	125.37	3,533 91	2,529.13	16,026.13	8,788.72	51.15	235,673.66	12
Leyden	.....	.....	.....	.....	.....	32.51	23,958.00	23,990.51	.....
Machias	1,136.61	18.28	425.26	712.54	2,204.30	2,565.59	1,284.67	54,288.10	7 1/2
Marblehead	1,301.33	44.24	1,530.12	180.85	3,370.62	1,737.67	10.09	36,674.77	3
Marion	6,242.26	258.97	4,478.56	1,364.33	8,531.02	5,601.42	1,370.15	139,737.12	12
Miantonomoh	3,764.79	145.92	5,244.60	1,269.86	9,792.54	4,608.77	9,806.43	122,267.95	12
Michigan	3,163.48	153.86	237.46	792.90	1,847.09	262.23	12,612.77	85,623.99	12
Minnesota (receiving ship)	3,303.57	13.92	285.52	1,199.97	232.73	405.13	552.61	95,479.08	12
Mohican	6,201.13	117.39	1,806.40	1,823.21	12,246.65	3,443.18	.....	135,278.02	12
Monitors	3,842.35	36.99	.....	959.94	284.15	.....	.....	46,164.07	12
Monocacy	5,177.82	69.26	2,952.14	1,300.87	8,667.49	2,720.02	.....	111,834.39	12
Monongahela	4,785.09	7.15	902.74	1,134.65	128.48	7,074.90	23,948.75	119,032.83	8 1/2
Monterey	2,091.77	243.83	1,190,52	2,511.58	16,711.01	200.63	21,583.55	169,392.22	12
Montgomery	378.30	.....	.....	69.64	133.81	.....	605.10	3,619.72	0 1/12
Naval Academy vessels	2,714.46	7.96	.....	4,288.69	.....	22.72	.....	69,907.26	12

Compilation showing cost of maintaining all naval vessels in commission during year ending June 30, 1894, excepting medicine.—Continued.

Vessels.	Value of stores expended.						Repairs at navy-yards while in commission.	Total.	Time in commission.
	Equipment.	Navigation	Ordnance	Construction and Repair.	Steam Engineering.	Supplies and Accounts.			
									Mos.
Newark	11,978.94	1,395.02	3,162.85	3,123.48	13,193.85	15,919.82	22,381.36	264,654.69	12
New York	5,492.76	440.52	10,970.01	6,143.32	66,386.94	16,455.64	130.67	327,974.74	11
Passaic	388.56	.....	114.99	62.34	39.75	.....	2,212.41	2,818.05	.....
Petrel	4,542.55	230.42	2,426.32	1,081.86	16,291.33	4,295.47	.....	103,502.78	12
Philadelphia	34,241.18	1,157.34	2,244.83	3,945.19	16,064.09	17,355.54	4,928.16	279,261.72	12
Pinta	7,389.00	54.24	275.10	1,214.00	3,654.85	102.69	.....	60,970.29	12
Portsmouth	6,048.31	66.37	1,221.86	1,095.28	38.52	9,629.86	9,510.77	127,401.56	12
Raleigh	.....	.....	.....	.....	.....	24.85	.....	19,143.23	2½
Ranger	2,500.87	60.22	1,121.16	1,203.99	18,115.18	4,479.28	8,402.54	113,888.30	12
Richmond	6,010.87	192.49	895.75	572.36	1,076.50	256.29	309.69	220,466.56	12
San Francisco	9,700.15	487.56	5,840.08	2,858.81	41,228.12	17,568.37	2,998.35	283,630.54	12
St. Louis (receiving ship)	2,118.01	7.62	59.94	228.55	.....	297.21	.....	67,575.39	12
Thetis	2,096.33	860.56	252.86	1,091.00	9,790.97	309.16	5,484.25	88,598.80	12
Vermont (receiving ship)	7,855.70	195.99	546.75	1,180.26	739.84	922.25	2,791.41	134,669.33	12
Vesuvius	1,004.99	86.51	7,348.63	594.05	5,018.78	80.12	4,629.53	67,648.75	12
Wabash (receiving ship)	4,531.12	88.38	676.48	1,150.41	1,621.17	4,947.97	3,371.52	114,074.22	12
Wahneta	.....	.....	.....	.....	.....	.....	.....	3,371.06	12
Yantic	6,720.26	200.13	1,121.06	1,925.98	4,247.51	6,891.59	.....	96,089.03	12
Yorktown	17,180.65	430.48	8,184.20	2,347.18	25,231.08	11,755.03	10,359.79	180,267.37	12
Total	299,639.56	18,105.76	158,658.23	105,904.01	611,862.22	246,690.73	586,122.83	7,166,905.82	

APPENDIX F.

Statement showing the value of supplies on hand July 1, 1893, the receipts from purchase and other sources and the expenditures during the year, and the balance on hand June 30, 1894.

			On hand July 1, 1893, with receipts and expenditures during fiscal year 1894.	Balances on hand June 30, 1894.
Balances on hand:				
Navy yard, Portsmouth			$1,036,767.05	$876,872.56
Navy-yard, Boston			1,889,691.51	1,844,742.44
Naval station, Newport			57,835.60	314,801.43
Naval station, New London			22,173.69	11,181.66
Navy-yard, New York			3,894,241.14	3,415,251.35
Navy-yard, League Island			887,627.01	746,482.21
Naval Academy, Annapolis			183,020.10	274,494.95
Navy-yard, Washington			2,438,612.23	2,229,026.04
Naval Observatory, Washington			40,749.18	34,741.17
Naval Proving Ground			63,528.75	141,220.63
Navy-yard, Norfolk			1,920,457.23	2,049,743.78
Naval station, Key West			32,051.90	33,573.59
Navy-yard, Pensacola			613,074.40	531,379.53
Navy-yard, Mare Island			2,426,030.21	2,568,741.48
Naval station, Puget Sound			25,733.66	25,733.66
World's Columbian Exposition			194,226.21	.....
Coaling station, Honolulu, Hawaiian Islands			.....	10,801.41
Coaling station, Pichilinque, Mexico			.....	9,714.99
Shipments between navy-yards in transit			467,735.63	492,820.22
Total on hand July 1, 1893			16,193,555.50	
Received during the fiscal year 1894:				
Under Title X—				
From open purchase	$1,208,075.17			
From contracts	5,821,570.30			
From gain by inventory	272,200.36			
From Title Z, manufactured articles	2,717,215.51			
From Titles B and Y, transfers from ships	1,275,877.45			
			11,294,938.79	
			27,488,494.29	
Expended during the fiscal year 1894:				
To Title A, for use	$2,535,439.43			
To Title B, for use	13,388.17			
To Title D, for use	155,721.90			
To Title E, for use	201,807.55			
To Title F, for use	382,802.39			
To Title G, for use	534,063.26			
To Title N, for use	76,868.33			
To Title O, for use	52,902.90			
To Title V, for use	17,230.80			
To Title Z, for use	3,568,434.87			
		7,538,659.60		
To Title V, sold to other departments		7,059.97		
To Title W, condemned		1,402,124.47		
To Title W, revalued		307,511.83		
To Titles B and Y, transfers to ships		2,621,815.32		
			11,877,171.19	
Total on hand June 30, 1894			15,611,323.10	15,611,323.10

APPENDIX G.

Statement of payments through the Paymaster-General's Office on contract, open purchase, and open contract vouchers during the fiscal year ending June 30, 1894.

Bureau.	Contract.	Open purchase.	Open contract.	Total.
Yards and Docks	$747,277.48	$96,567.70	$36,166.01	$880,011.19
Equipment	317,243.07	264,591.51	25,645.82	607,480.[illegible]0
Navigation	50,994.05	62,494.96	37,740.70	151,229.71
Ordnance	5,649,687.40	635,719.44	61,282.25	6,346,689.09
Construction and Repair	176,065.65	316,979.44	7,890.55	500,935.64
Steam Engineering	160,247.51	166,555.50	7,153.10	333,956.11
Supplies and Accounts	614,289.23	45,115.62	17,131.39	676,536.24
Medicine and Surgery	65,679.92	60,766.58	30,459.72	156,904.22
Secretary's Office	6,528,293.45	5,334.47	48,587.99	6,582,215.91
Total	14,309,775.76	1,654,125.22	272,057.53	16,235,958.51

APPENDIX H.

Statement of the value of naval stores received and expended on board ships in commission for the year ending June 30, 1894.

Bureaus.	Balance on hand July 1, 1893.	Receipts.	Total receipts.	Expended to use, and condemned.	Expended, transferred.	Issued to officers, crew, and marines for cash.	Total issues.	Balance on hand June 30, 1894.
Equipment	$1,566,851.29	$1,168,766.49	$2,735,620.78	$317,992.30	$1,002,130.08	.....	$1,320,122.38	$1,415,498.40
Ordnance	4,161,428.73	1,679,776.24	5,841,204.97	158,658.23	924,480.06	.....	1,083,138.29	4,758,066.68
Construction	474,618.20	333,722.20	808,340.40	105,904.01	177,217.61	.....	283,121.62	525,218.78
Steam Engineering	261,104.98	714,319.36	975,424.34	611,862.22	54,043.12	.....	665,905.34	309,519.00
Supplies and Accounts	358,402.63	837,549.49	1,195,952.12	255,155.41	243,271.20	$346,251.03	844,677.64	351,274.48
Total	6,822,408.83	4,734,133.78	11,556,542.61	1,449,572.17	2,401,142.07	346,251.03	4,196,965.27	7,359,577.34

SUMMARY.

Balance on hand July 1, 1893	$6,822,408.83	
Received during year 1893–'94	4,734,133.78	
		$11,556,542.61
Expended to use, and condemned	1,449,572.17	
Expended, transferred	2,401,142.07	
Issued to officers, crew, and marines for cash	346,251.03	
		4,196,965.27
Balance on hand June 30, 1894		7,359,577.34
Value of naval stores in transit from yards and stations to ships		142,268.38
Total value of naval stores on board ships and in transit		7,501,845.72

APPENDIX I.

Statement of public sales and reports of deposits during the fiscal year 1894 on account of sales of Government property.

Date of sale.	Place of sale.	By whom deposited.	Gross receipts.	Expenses of sale.	Net proceeds.	Credited to miscellaneous receipts.	Credited to appropriation— Clothing and small stores fund.	Credited to appropriation— Ordnance material; proceeds of sales.
Nov. 17, 1892	New York	A. Burtis	$2,020.58		$2,020.58	$2,020.58		
Dec. 6, 1892	League Island	J. N. Speel	691.19	$101.20	589.99	589.99		
May 11, 1893	Boston	C. A. McDaniel	2,213.21	106.40	2,106.81	2,099.53		$7.28
May 31, 1893	Washington	S. Rand	19,823.98		19,823.98	66.00		19,757.98
June 12, 1893	Norfolk	H. T. Stanclift	7,191.42	654.22	6,537.20	5,859.71	$587.07	90.42
Oct. 14, 1893	Mare Island	H. T. Skelding	40.50	3.00	37.50	37.50		
Nov. 18, 1893	Boston	T. S. Thompson	25.00	19.50	5.50	5.50		
Jan. 5, 1894	Washington	S. Rand	14,112.49	556.32	13,556.17	644.09		12,912.08
Jan. 10, 1894	Mare Island	H. T. Skelding	8,329.03	975.29	7,353.74	2,792.17	4,312.84	248.73
Jan. 16, 1894	Pensacola	W. B. Wilcox	5.00		5.00	5.00		
Jan. 19, 1894	Norfolk	W. W. Galt	718.00	12.60	705.40	705.40		
Jan. 31, 1894	New York	A. Burtis	202.80	202.80				
May 8, 1894	Mare Island	H. T. Skelding	1,234.65	1,194.12	40.53			40.53
			56,607.85	3,825.45	52,782.40	14,825.47	4,899.91	33,057.02

List of purchasers, with amount received from each.

Navy-yard, New York, N.Y., November 17, 1892:

E. H. Wilson & Co	$2,020.58

Navy-yard, League Island, Pa., December 6, 1892:

David France	6.00
Gill & Co	553.85
Hitner & Sons	66.36
Isaac Simmons	40.50
Wilson & Vare	24.48
	691.19

Navy-yard, Boston, Mass., May 11, 1893:

L. F. S. Davis	19.25
Hallett & Son	12.00
L. E. Lunt	3.23
Nolan Bros	2,178.73
	2,213.21

Navy-yard, Washington, D. C., May 31, 1893:

B. Lowenstein	15,381.73
O. P. Anderson	3,025.34
J. Rosenthall Sons	710.30
S. J. McArdle	706.61
	19,823.98

Navy-yard, Norfolk, Va., June 12, 1893:

J. Dreifus & Co	1,234.53
N. Kane's Sons	1,064.98
W. H. H. Cory	584.85
Nolan Bros	427.68
J. Robertson	495.20
J. W. Woodman	292.21
W. F. Lintz	327.85
W. H. Gregory	384.50
W. S. Kirk	252.19
E. B. Freeman & Co	316.92
H. C. Niemeyer	129.01
Hallett & Son	414.14
Thos. Campbell	174.62
L. E. Lunt	652.73
J. Gallilee	38.50
J. W. Abbott	44.00
Thos. Talbott	34.00
B. Meads	45.00

Navy-yard, Norfolk, Va., June 12, 1893—Continued.

W. W. Gaskins	$15.00
R. Curtis & Co	10.00
M. I. Ash	67.47
C. C. Furguson	15.25
F. Fischler	21.00
J. C. Green	15.25
C. R. Morse	21.00
C. L. Sawyer	18.00
J. W. Watts	15.00
H. F. Smith	18.00
G. S. Briggs	20.00
J. A. Thews	15.00
W. H. Fairless	7.50
C. McDonald	5.00
E. M. Stoddard	3.00
W. Reed	5.00
A. H. Lindsay	3.00
M. H. Baker	0.44
D. Graham	2.50
O. L. Williams	.10
	7,191.42

Navy-yard, Mare Island, Cal., October 14, 1893:

J. O'Brien	20.50
J. McMamis	15.00
Jas. Dolan	5.00
	40.50

Navy-yard, Boston, Mass., November 18, 1893:

W. F. Davis	25.00

Navy-yard, Washington, D. C., January 5, 1894:

J. E. Lonergan & Co	5,752.20
E. H. Wilson	2,495.73
M. H. Gregory	1,820.57
T. Butler & Co	1,418.36
M. Frank & Son	1,397.02
A. Purvis & Son	489.14
J. Rosenthall & Son	225.77
J. B. Kendall	101.00
L. Hopfenmeier	80.50
J. Dreifus & Co	67.67
F. J. Einstein	45.00

List of purchasers, with amount received from each—Continued.

Navy-yard, Washington, D. C., January 5, 1894—Continued.	
C. Baum	$15.00
G. F. Kozel	55.00
S. W. Skinner	20.00
J. Mullen	56.03
W. E. Earnshaw	27.50
F. Tooney	28.00
W. P. Keene	13.00
G. A. Nowland	5.00
	14,112.49
Navy-yard, Mare Island, California, January 10, 1894:	
W. J. Baunerman	3,049.08
Harley & Co	1,661.21
W. Streichan	554.75
L. Schwabacher	433.33
J. Pantoskey	366.63
F. Baunerman	195.22
R. J. R. Aden	240.30
V. V. Harrier	102.65
L. Foard	160.32
J. Belasco	537.02
P. McCarthy	137.50
E. Supplee	120.75
W. B. Vankirk	64.22
Livingston & Co	19.30
C. E. Budrow	54.75
L. Wenle	51.75
Lietz & Co	61.50
Goldstein & Livingston	85.30
Grothwell & Lesser	10.75
W. S. Kirk	82.90
D. Roberts	78.75
Navy-yard, Mare Island, California, January 10, 1894—Continued.	
M. Regan	$19.50
F. Burgess	27.15
H. Monroe	99.00
A. Dow	51.00
J. N. Greenwood	41.90
J. Harding	8.90
R. Alison	6.00
J. Brownlie	6.75
W. J. Corwin	5.00
R. Barry	5.00
M. K. Houghton	75
	8,329.03
Navy-yard, Pensacola, Fla., January 16, 1894:	
Lucy Elder	5.00
Navy-yard, Norfolk, Va., January 19, 1894:	
L. E. Lunt	718.00
Navy-yard, New York, N. Y., January 31, 1894:	
Seligman Bros	47.80
W. J. Baunerman	26.00
C. J. Ross	29.00
E. R. Squibb & Son	100.00
	202.80
Navy-yard, Mare Island, May 8, 1894:	
J. Pantoskey	1,234.65

RECAPITULATION.

Washington	$33,936.47
Mare Island	9,604.18
Norfolk	7,909.42
New York	2,223.38
Boston	2,238.21
League Island	681.19
Pensacola	5.00
Gross proceeds	56,607.85
Expenses of sales	3,825.45
Net proceeds	52,782.40
Deposited to credit:	
Miscellaneous receipts	14,825.47
Clothing and small stores fund	4,899.91
Ordnance and ordnance stores	33,057.02
Total	52,782.40

APPENDIX J.

SCHEDULE OF PROPOSALS RECEIVED.

Proposals for annual supplies for the Naval Home, Philadelphia, Pa., under Bureau advertisement dated May 6, 1893; opened May 31, 1893.

Class 1.—Brushes, etc.:	
Chas. J. Field	$231.28
Nelms & Co.*	166.19
J. Jacob Shannon & Co	209.67
Shoemaker & Busch	197.25
Class 2.—Building material:	
A. P. Swoyer & Co.*	444.70
Paul J. Field	486.75
Class 3.—Signal halyards:	
Chas. J. Field*	29.52
J. Jacob Shannon & Co	29.69
Paul J. Field	36.08
Class 4.—Clothing:	
Garitee, Son & Allen†	6,500.00
Jacob Reed's Sons	6,728.75
Wanamaker & Brown*	6,534.50
Class 5.—Boots and shoes:	
Robert Holland*	1,153.00
Class 6.—Bedding:	
Thos. G. Hood*	1,071.14
Wm. Heaton†	
Class 7.—Coal:	
Samuel G. French	3,901.00
Frank F. Matthews	3,439.00
Chas. B. Rees, Son & Co	3,567.50
Martin J. Carroll	3,625.00
McBride Bros*	3,373.00
David S. Wells	3,818.00
Joseph B. Van Dusen, jr	3,622.50
Beale, Peacock & Kerr	3,513.50
Class 8.—Firewood:	
Frank F. Matthews	181.25
Joseph B. Van Dusen, jr	181.25
Andress & Bryant	275.00
John G. Andrews*	168.75
Class 9.—Kitchen utensils:	
Chas. J. Field*	716.83
J. Jacob Shannon & Co	821.13
Paul J. Field	1,024.15
Class 10.—Furniture:	
Chas. J. Field*	468.00
J. Jacob Shannon & Co	477.48
Paul J. Field	490.00
Class 11.—Window glass:	
Chas. J. Field	26.25
John Lucas & Co	25.92
A. P. Swoyer & Co	24.45
J. Jacob Shannon & Co	25.50
Shoemaker & Busch*	24.00
Class 12.—Hardware:	
Chas. J. Field*	336.55
J. Jacob Shannon & Co	380.19
Paul J. Field	493.45
Class 13.—Lumber:	
S. C. Forsaith Machine Co	$127.50
Elias Pohl*	1,053.60
Chas. F. Maul	1,202.50
Class 14.—Paints:	
John Lucas & Co	526.25
H. P. Swoyer & Co	594.10
J. Jacob Shannon & Co	564.79
Shoemaker & Busch*	521.06
Aquila Rich	590.15
Class 15.—Provender:	
Wm. Hall*	256.00
S. S. Daish & Son	373.50
Paul J. Field	315.40
Class 16.—Groceries:	
Robert McKeown*	9,213.70
Horace A. Doan	14,221.76
Class 17.—Provisions:	
Wm. Roesch	12,569.00
Daniel Snyder & Son*	9,943.50
Class 18.—Fresh bread:	
The Grocers' Baking Co	2,545.00
Geo. Goetz*	1,980.00
Geo. W. Wanklin	2,100.50
Class 19.—Tools:	
Chas. J. Field*	141.85
J. Jacob Shannon & Co	157.50
Paul J. Field	222.85
Class 20.—Ice:	
Chas. B. Rees, Son & Co.*	268.80
Knickerbocker Ice Co	300.00
The Commercial Ice Co	300.00
Class 21.—Soap, etc.:	
Oliver Parker	366.38
Robert McKeown*	345.95
H. P. Swoyer & Co	409.37
Horace A. Doan	492.80
J. Jacob Shannon & Co	454.74
Shoemaker & Busch	362.54
Class 22.—Harness:	
J. Jacob Shannon & Co.*	85.80
Paul J. Field	122.50
Class 23.—Belting:	
Chas. J. Field	52.88
J. Jacob Shannon & Co.*	46.20
Wm. Heaton	70.08
Class 24.—Sponges, etc.:	
Chas. J. Field	38.79
J. Jacob Shannon & Co	43.05
Paul J. Field	58.00
Shoemaker & Busch*	33.60

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated May 16, 1893; opened June 6, 1893.

Class 1.—Cotton canvas:	
Henry C. Broking	$3,496.25
The Manhattan Supply Co.*	3,367.00
Lewis Anderson & Co	3,891.50
Mount Vernon Co.†	3,210.00
J. B. Morrell & Co	3,419.62
Class 2.—Flax canvas:	
Henry C. Broking	$673.00
Lewis Anderson & Co	730.00
J. T. Morrell & Co.*	660.00

Proposals for fresh provisions and provender for the navy-yard, Portsmouth, N. H., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
James E. Chase	$0.08½
	.02
Clarence M. Prince*	.06¾
	.01⅞
Herman R. Paul	.08
	.02
D. C. Norton & Co	.11½
	.03½
Class 2:	
Clarence M. Prince	$0.06
D. C. Norton & Co	.05¼
Willard I. Spinney*	.04⅞
Class 3:	
S. S. Daish & Son	2,223.80
George A. Hammond	2,337.60
D. C. Norton & Co	1,931.00
Joseph Lawton	2,089.60

* Accepted. † Informal.

Proposals for fresh provisions and provender for the navy-yard, Boston, Mass., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Harrington Bros	$0.14½
	.04
George E. Robinson & Co	.13½
	.04
Belford & Morrison*	.12½
	.03½
Charles A. Simonds	.13
	.03½
Class 2:	
George A. Sanderson	$0.05½
Belford & Morrison*	.04 75/100
George C. Stickney	.05 73/100
Austin & Graves	.05¼
Class 3:	
The Drivers' Union Ice Co.*	.00½
Class 4:	
S. S. Daish & Co.*	1,377.90
John Mullet	1,743.90

Proposals for fresh provisions and provender for the torpedo station, Newport, R. I., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Belford & Morrison	$0.13
	.04
John T. Reagan	.12
	.03
John T. Keefe*	.09
	.02¼
Class 2:	
Jeremiah J. Lynch*	$0.03½
Class 3:	
The estate of Lawton Coggeshall*	.007
Class 4:	
S. S. Daish & Son	351.70
Joseph G. Stevens	342.07

Proposals for fresh provisions and provender for the naval station, New London, Conn., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Belford & Morrison	$0.13
	.04
Chas. H. Klinck*	.09
	.03
Class 2:	
Belford & Morrison	.08
Class 2—Continued.	
Christina Rodewald	$0.04½
G. Williams & Son	.04
Class 3:	
Chas. H. Klinck	233.12
S. S. Daish & Son*	218.08

Proposals for fresh provisions and provender for the New York navy-yard, under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Michael Cloonen	$0.05 95/100
	.00½
Belford & Morrison	.07¼
	.01¼
John Harrison*—	
In harbor	.05¼
	.00 98/100
At yard	.05¼
	.00½
John Hanley	.05¼
	.01¼
Class 2:	
Andrew Koch	$0.03 47/100
Belford & Morrison	.03 41/100
Anton Behler*	.02 99/100
John Harrison†—	
In harbor	.03½
At yard	.03½
William E. Barr	.03 49/100
Class 3:	
John Harrison	$0.06½
The Treadwell & Harris Baking Co.*	.03 57/100
Charles T. Goodwin & Son	.04 19/100
Class 4:	
Michael Cloonen	.30
William J. Belford*	.00½
John Harrison	.00¾
Class 5:	
Andrew Koch	2,513.00
S. S. Daish & Son	2,760.50
John Moonan	2,454.00
William J. Belford*	2,401.40
John Harrison	2,748.40
Charles L. Richardson	2,414.14

Proposals for fresh provisions and provender for the League Island navy-yard, under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
John O. Keim	$0.14
	.06
Belford & Morrison*	.12½
	.03½
Class 2:	
John O. Keim	.06
Belford & Morrison	.04 55/100
Class 3:	
The Knickerbocker Ice Co.*	.00¾
Class 4:	
The P. A. Swartz Co.*	$2.169.77
Charles Dunwoody	2,316.10
S. S. Daish & Son	2,178.00
Class 5:	
James Gardner	21.40
The George Richards Co.*	470.50
S. S. Daish & Son	507.30

Proposals for fresh provisions and provender for the Naval Academy, Annapolis, Md., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
William J. Brewer*	$0.08½
	.04
Class 2:	
Martin M. Smith*	.04
Class 3:	
Joseph S. M. Basil*	.00¾
Class 4:	
Henry B. Myers*	$0913.10
Joseph S. M. Basil	954.00
S. S. Daish & Son	1,027.80

* Accepted.

† Harrison failed to execute contract; the class readvertised, proposals to be opened July 25, 1893.

Proposals for fresh provisions and provender for the navy-yard, Washington, D. C., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
R. J. Earnshaw †	
Class 2:	
R. J. Ernshaw *	$0.03½
Class 3:	
Great Falls Ice Co.	.40
The Independent Ice Co	.41
Class 4:	
Walter F. Hewitt	$1,245.50
Ralph L. Galt	1,228.50
S. S. Daish & Son	1,330.00
R. B. Earnshaw & Bro.*	1,108.87
R. J. Earnshaw	1,245.50

Proposals for fresh provisions and provender for the navy-yard, Norfolk, Va., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Chas. R. Robertson	$0.10
	.03½
D. S. Baum *	.05 $\frac{99}{100}$
	.01 $\frac{99}{100}$
Louis Wasserman	.06½
	.01½
Class 2:	
C. F. Cabler*	.02 $\frac{99}{100}$
F. Rieger	.03 $\frac{99}{100}$
Class 3:	
John K. Gann	$0.00¾
Patrick J. Lyons*	.00½
Class 4:	
Lindsay & Co	1,769.59
S. S. Daish & Son	2,679.25
O. L. Williams	1,794.14
F. L. Grandy*	1,718.24
H. E. Owen.†	

Proposals for fresh provisions for the naval station, Key West, Fla., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
S. O. Johnson*	$0.12
	.06
Class 2:	
Otto Kercheimer	$0.07
Frank Feurstein	.07
Robert Sanford*	.06½

Proposals for fresh provisions and provender for the navy-yard, Pensacola, Fla., under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
John S. Bell	$0.09½
	.04½
Wm. L. Hubbard*	.03½
	.10
G. V. Johnson	.11½
	.05½
Class 2:	
Moses White‡	.05
John S. Bell *‡	.05
Class 3:	
C. E. Saunders & Co.*	$0.01¼
Class 4:	
T. J. McKenzie Oerting	819.56
F. Bauer*	741.24
S. S. Daish & Son	1,046.77

Proposals for provisions and provender for the Mare Island navy-yard, under Bureau advertisement dated May 18, 1893; opened June 10, 1893.

Class 1:	
Sam'l Brown	$0.07
	.02
Hammond & Brod *	.05 $\frac{9}{10}$
	.01
Class 2:	
Wm. H. Ward *	.02½
C. H. Bogart	.03½
Clarence M. Brown	.05½
James Smith	.03½
Class 3:	
The American Biscuit Co.*	$0.05 $\frac{99}{100}$
C. H. Bogart	.06
Class 4:	
Henry Connelly	.02½
Oliver C. Smith	.01 $\frac{99}{100}$
Class 5:	
James Brownley	4,764.10
James Megarry	5,519.75
Louis E. Lake *	4,013.00

Proposals for supplies for the Naval Academy, Annapolis, Md., under Bureau advertisement dated May 24, 1893; opened June 13, 1893.

Class 1:	
Geo. L. Neville*	$61.50
Southern Electric Co.†	35.20
Class 2:	
Geo. L. Neville *	44.70
Class 3:	
Open purchase.	
Class 4:	
Shoemaker & Busch *	$25.80
Class 5:	
Shoemaker & Busch *	347.40

* Accepted. † Informal. ‡ Tie bid.

Proposals for supplies for the navy-yard, Boston, Mass., under Bureau advertisement dated May 26, 1893; opened June 13, 1893.

Class 1:	
A. P. Swoyer & Co.†	$196.44
Class 2:	
The Manhattan Supply Co.*	78.50
Class 3:	
The Manhattan Supply Co	109.57
Harry L. Briggs*	86.03
A. M. Gardner Hardware Co	91.97
Class 4:	
Henry S. Manning	30.00
The Manhattan Supply Co.*	25.30
Aquila Rich	31.00
Class 5:	
Open purchase.	
Class 6:	
The Gutta Percha and Rubber Manufacturing Co	260.71
The Manhattan Supply Co	363.94
Aquila Rich*	213.09
Class 7:	
Chas. M. Childs & Co.*	210.47
Thos. S. Harrison	228.04
The Manhattan Supply Co	283.55
Gould & Cutler Corporation‡	206.35
Shoemaker & Busch	234.82
Aquila Rich	228.49
A. M. Gardner Hardware Co	232.99
Class 8:	
Shoemaker & Busch*	134.70
Aquila Rich	149.40
Class 9:	
Chas. M. Childs & Co	189.00
Thos. S. Harrison*	178.20
The Walker Paint Co	180.00
The Manhattan Supply Co	216.00
Wetherill & Bro	189.90
Gould & Cutler Corporation	187.50
Shoemaker & Busch	202.20
Aquila Rich	190.20
A. M. Gardner Hardware Co	183.00
Class 10:	
Chas. M. Childs & Co	77.75
Thos. S. Harrison	96.25
The Manhattan Supply Co	82.00
Gould & Cutler Corporation	129.50
Shoemaker & Busch*	71.45
Aquila Rich	74.50
A. M. Gardner Hardware Co	130.50
Class 11:	
The Manhattan Supply Co	$292.45
Frost & Adams*	268.28
Class 12:	
The Manhattan Supply Co.*	81.55
Class 13:	
The Manhattan Supply Co.*	73.48
Frost & Adams	86.25
Class 14:	
The Manhattan Supply Co	149.50
S. C. Forsaith Machine Co.*	133.47
Hill, Clarke & Co.	
A	157.00
B	150.00
Class 15:	
The Manhattan Supply Co.*	78.80
S. C. Forsaith Machine Co	113.75
Hill, Clarke & Co	110.00
Class 16:	
The Manhattan Supply Co	284.00
S. C. Forsaith Machine Co	247.50
Hill, Clarke & Co.*	179.00
Class 17:	
J. W. W. Moyer*	68.25
Class 18:	
The Manhattan Supply Co.*	351.00
Class 19:	
The Manhattan Supply Co.*	677.82
Harry L. Briggs	398.65
Class 20:	
Andrew J. Morse & Son*	1,290.00
Class 21:	
Henry S. Manning	28.40
The Manhattan Supply Co.*	23.00
Class 22:	
Geo. L. Neville	432.90
Henry S. Manning	382.21
Graton & Knight Manufacturing Co	397.93
Page Belting Co	329.57
Loeb Bros*	300.19
Class 23:	
Chas. M. Childs & Co	264.35
Thos. S. Harrison	267.75
The Manhattan Supply Co	301.50
Gould & Cutler Corporation	315.00
Shoemaker & Busch	292.45
Aquila Rich*	257.85

Proposals for supplies for the navy-yard, League Island, Pennsylvania, under Bureau advertisement dated May 25, 1893; opened June 13, 1893.

Class 1:	
Walter L. Clark	$769.00
Howard W. Middleton	739.00
Henry S. Manning	897.00
A. P. Swoyer & Co	749.00
Cox & Sons Co.*	725.00
Philadelphia Machinery and Supply Co	739.00
S. C. Forsaith Machine Co	808.00
Chas. J. Field	749.50
Class 2:	
Walter L. Clark	$59.30
Harry L. Briggs	38.94
A. P. Swoyer & Co	50.13
Cox & Sons Co	65.50
Philadelphia Machinery and Supply Co.*	28.80
S. C. Forsaith Machine Co	81.19
Chas J. Field	48.20

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated May 22, 1893; opened June 13, 1893.

Class 1:	
Fiske Bros	$1,745.00
Charles Becker	1,996.87
The Manhattan Oil Co*	1,693.75
Class 2:	
International Trading and Electric Co	750.00
Walter D. Clark*	619.00
Southern Electric Co.†	700.00
The Pennsylvania Electric Engineering Co	650.00
Richard B. Smith	635.00
Edward P. Hampson & Co	660.00
Royce and Mareau	659.00
Geo. G. Dennison	800.00
Class 3:	
Dwight H. Washburn	$565.00
Geo. L. Neville	625.00
Fiske Brothers*	535.00
International Trading and Electric Co	711.00
Walter D Clark	599.00
Southern Electric Co.†	639.00
The Pennsylvania Electric Engineering Co	675.00
The General Electric Co	625.00
Royce & Mareau	730.00
Geo. G. Dennison	700.00
Class 4	
Geo. L. Neville	435.80

* Accepted. † Open purchase. ‡ Informal.

sals for supplies for the navy-yard, Washington, D. C., etc.—Continued.

itinued.

ional Trading and Electric	
.....	$360.15
Electric Co.†	395.36
ansylvania Electric Engi-	
g Co.....	395.30
eral Electric Co.....	427.88
Mareau	428.10
. Dennison	491.88
. Neville	399.21
ional Trading and Electric	
.....	304.37
oyer & Co	288.25
Electric Co.†	270.27
ansylvania Electric Engi-	
g Co.....	316.87
eral Electric Co.....	299.31
eley & Co.*	267.47
Mareau.....	300.80
. Dennison.....	489.00
eley & Co.*	140.75
. Briggs.....	157.51
Neville	375.85
oyer & Co.*	298.22
Pleasants	348.35
. Briggs	343.43
Neville*.....	90.00
anker & Co	115.00

rchase.

Class 10:

Fiske Brothers*	$21.75

Class 11:

S. C. Forsaith Machine Co.....	792.25
Geo. L. Neville.....	955.22
International Trading and Electric Co	884.50
New York Leather Belting Co.....	766.88
The Heim Belting Co	950.00
The Pennsylvania Electric Engineering Co.....	787.60
Harry L. Briggs.....	813.00
Henry S. Manning	808.40
Loeb Brothers*.....	727.25

Class 12:

S. C. Forsaith Machine Co.....	684.63
Philadelphia Machinery and Supply Co	431.41
Harry L. Briggs*	424.23
Henry S. Manning	606.38

Class 13:

Geo. L. Neville.....	46.35
A. P. Swoyer & Co.*	35.82
James Clendenin.....	35.95

Class 14:

A. P. Swoyer & Co	855.71
Philadelphia Machinery and Supply Co	896.28
Harry L. Briggs*	700.20

Class 15:

Open purchase.

for supplies for the New York navy-yard, under Bureau advertisement dated May 23, 1893; opened June 13, 1893.

saith Machine Co.....	$0.11 4/10
nustock.....	.12
hattan Supply Co.....	.13 55/100
hattan Oil Co	.10
lker, jr.*.....	.10 8/10
ggs.....	.31 48/100
Ahrens*	.30
hattan Supply Co.....	.34 33/100
saith Machine Co.....	366.00
Hall Marvin Co.....	369.00
hattan Supply Co.....	410.40
Pleasants*.....	320.85
len Steel Co	1,672.60
lman Iron and Steel Co.*.	1,432.91
Steel Co.....	1,563.18
oodruff & Co	2,084.24
saith Machine Co	783.75
Steel Co.*	760.45
oodruff & Co	889.63
len Steel Co	2,095.19
lman Iron and Steel Co.*	1,794.95
Steel Co.....	1,958.13
oodruff & Co	2,610.84
saith Machine Co.....	993.50
Steel Co.*.....	964.81
oodruff & Co.....	1,129.72
hattan Supply Co.*.....	33.35
Briggs	34.55
ker Paint Co.....	180.00
Donagh & Co	189.00
Childs & Co.....	183.00
Pleasants	202.20
S. Harrison*.....	178.20
ich	190.20
er & Busch	202.20

Class 10:

Wm. McDonagh & Co	$211.60
Chas. M. Childs & Co.*	203.91
Chas. H. Pleasants.....	236.15
Thos. S. Harrison.....	230.90
Aquila Rich	271.35
Shoemaker & Busch	216.30

Class 11:

Morse Burtiss	120.00
Chas. H. Pleasants.....	139.50
Aquila Rich	124.50
Shoemaker & Busch*.....	112.25

Class 12:

J. R. Donelly	48.00
Benjamin H. Shoemaker.....	54.00
The Manhattan Supply Co.*	44.40
Chas. H. Pleasants.....	45.48
A. P. Swoyer & Co	52.80
Harry L. Briggs.....	47.40

Class 13:

The Manhattan Supply Co.*	5.76
A. P. Swoyer & Co	11.76
Harry L. Briggs	6.72
Shoemaker & Busch	11.76

Class 14:

The Manhattan Supply Co.....	48.35
Harry L. Briggs*.....	29.70

Class 15:

S. C. Forsaith Machine Co. *.....	109.00
The Manhattan Supply Co.....	157.80

Class 16:

The New York Packing and Belting Co	183.30
The Manhattan Supply Co.....	213.37
The Philadelphia Machinery and Supply Co.....	175.95
The Gutta Percha Rubber Manufacturing Co.*.....	160.63
Aquila Rich	184.53

Class 17.

S. C. Forsaith Machine Co.....	1,125.54
Morse Burtis*.....	1,066.32
The Manhattan Supply Co.....	1,183.44
Donegan & Swift.....	1,252.80
A. P. Swoyer & Co	1,238.45
E. T. Tweedy.....	1,139.42

* Accepted. † Informal.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 18:	
S. C. Forsaith Machine Co	$966.60
Geo. L. Neville	791.28
Morse Burtis*	683.95
The Kennedy Valve Manufacturing Co	1,063.86
The Manhattan Supply Co	742.75
Donegan & Swift	1,076.35
A. P. Swoyer & Co	941.98
E. T. Tweedy	927.50
Class 19:	
Geo. L. Neville	696.05
Morse Burtis*	657.60
The Manhattan Supply Co	712.96
Donegan & Swift	723.54
A. P. Swoyer & Co	840.55
Class 20:	
The Manhattan Supply Co.*	$44.00
Class 21:	
Geo. L. Neville	251.70
Morse Burtis*	172.80
The Manhattan Supply Co	199.29
The Philadelphia Machinery and Supply Co	187.56
Donegan & Swift	186.00
A. P. Swoyer & Co	184.29
Harry L. Briggs	174.00
Class 22:	
Simpson McIntire & Co	.26 $\frac{51}{100}$
Chas. E. Ahrens*	.24 $\frac{45}{100}$
Belford & Morrison	.33

Proposals for supplies for the navy-yard, Norfolk, Va., under bureau advertisement dated June 5, 1893; opened June 24, 1893.

Class 1.—Bolts:	
J. H. Sternbergh*	$298.22
Mayer & Co	457.05
Geo. L. Neville	333.09
Class 2.—Brushes and brooms:	
Harry L. Briggs	255.52
Ira B. White	295.00
J. B. Morrell & Co	262.05
The Manhattan Supply Co	301.30
Mayer & Co	371.50
Geo. L. Neville	362.00
Class 3.—Cotton canvas:	
J. B. Morrell & Co	327.50
The Manhattan Supply Co	327.50
Henry C. Broking*	314.00
Geo. L. Neville*	341.25
Class 4.—Flax canvas:	
Ira B. White	256.00
J. B. Morrell & Co	308.00
The Manhattan Supply Co	278.00
Harry C. Broking*	247.50
Geo. L. Neville	276.00
Class 5.—Hammock and bag duck:	
J. B. Morrell & Co*	211.00
The Manhattan Supply Co	250.00
Geo. L. Neville*	250.00
Class 6.—Glass:	
Ira B. White	139.60
J. B. Roache	112.80
J. B. Morrell & Co	148.00
The Manhattan Supply Co	107.50
A. P. Swoyer & Co	100.30
Mayer & Co	171.00
Geo. L. Neville	105.24
Shoemaker & Busch*	91.02
Class 7.—Hardware:	
Harry L. Briggs	307.97
Ira B. White	321.64
The Manhattan Supply Co	319.97
J. H. Chesley & Co.*	304.26
Mayer & Co	425.74
Geo. L. Neville	337.19
Class 8.—White pine:	
S. C. Forsaith Machine Co	1,653.00
Chas. S. Connor	3,240.00
Edwin A. Gaskill*	1,567.00
A. A. McCullough	2,243.00
Geo. L. Neville	2,130.00
Class 9.—Yellow pine:	
Chas. S. Connor	530.63
Edwin A. Gaskill	530.63
A. A. McCullough*	282.25
Geo. L. Neville	451.60
Class 10.—Spruce and elm:	
Chas. S. Connor†	337.10
A. A. McCullough‡	
Class 11.—Leather and belting:	
Ira B. White	297.25
J. B. Roache	239.78
The Manhattan Supply Co	249.20
Norfolk Supply Co	255.40
Mayer & Co	353.75
Page Belting Co.*	218.65
Geo. L. Neville	244.40
Class 12.—Tools:	
Harry L. Briggs*	$154.00
Geo. L. Neville	228.75
Class 13.—Pig tin and Tobin's bronze:	
Ira B. White	1,270.20
A. P. Swoyer & Co	1,115.18
The Ansonia Brass and Copper Co.*	1,053.42
Mayer & Co	1,141.00
Geo. L. Neville	1,094.55
Class 14.—Bar iron:	
S. C. Forsaith Machine Co	533.47
Ira B. White	459.11
A. P. Swoyer & Co.*	338.42
Geo. L. Neville	333.55
Class 15.—Steel:	
S. C. Forsaith Machine Co.§	
A. P. Swoyer & Co.*	357.38
Geo. L. Neville	660.65
Class 16.—Packing:	
Fiske Bros	330.15
Harry L. Briggs	290.40
Gutta-Percha and Rubber Manufacturing Co	346.90
Ira B. White	392.00
Manhattan Supply Co	309.85
New Jersey Car Spring and Rubber Manufacturing Co.*	254.75
New York Belting and Packing Co.	265.10
Norfolk Supply Co	336.25
Mayer & Co	382.10
Page Belting Co	344.50
Geo. L. Neville	366.25
Class 17.—White zinc:	
Chas. M. Childs*	201.60
Ira B. White	259.20
J. B. Morrell & Co	296.00
Aquila Rich	274.88
Norfolk Supply Co	224.00
Mayer & Co	384.00
Geo. L. Neville	352.00
Class 18.—White lead:	
Chas. M. Childs & Co.*‖	375.00
Ira B. White	377.06
J. B. Morrell & Co	399.25
Wetherell & Bro	397.13
Aquila Rich	375.00
Norfolk Supply Co	411.75
Mayer & Co	468.00
Geo. L. Neville	427.00
Class 19.—Turpentine:	
Chas. M. Childs & Co.*	148.12
Ira B. White	150.00
J. B. Morrell & Co	174.00
Aquila Rich	152.25
Norfolk Supply Co	163.50
Mayer & Co	225.00
Class 20.—Linseed oil:	
Manhattan Oil Co	292.50
Chas. M. Childs & Co	274.25
Ira B. White	291.50
J. B. Morrell & Co	303.50
Aquila Rich	281.00
Norfolk Supply Co	295.00
Mayer & Co	310.00
Geo. L. Neville	310.00

*Accepted. †Open purchase. ‡Informal §Withdrawn. ‖By lot.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

-Lard oil:	
Bros *	$365.00
attan Oil Co	387.50
M Childs & Co	600.00
Morrell & Co	386.00
lk Supply Co	395.00
r & Co	450.00
. Neville	500.00
-Paints:	
M. Childs & Co	425.83
White	450.85
a Rich *	411.66
lk Supply Co	472.90
r & Co	523.10
. Neville	463.40
aker & Busch	419.47
-Varnishes:	
Bros	193.25
L. Briggs	192.65
M Childs & Co	177.05
Ira B. White	$153.50
J. B. Morrell & Co	184.75
Aquila Rich *	138.50
Norfolk Supply Co	246.35
Mayer & Co	315.75
Geo. L. Neville	188.25
Shoemaker & Busch	147.20
Class 24.—Tools:	
Harry L. Briggs *	74.43
Ira B. White	84.44
Norfolk Supply Co	77.03
J. H. Chesley & Co	76.99
Mayer & Co	87.73
Geo. L. Neville	75.73
Class 25.—Beeswax, soap, etc.:	
Ira B. White	78.00
J. B. Morrell & Co	113.60
Manhattan Supply Co	73.70
Geo. L. Neville *	63.00

ls for supplies for the New York navy-yard under advertisement dated June 3, 1893; opened June 24, 1893.

Brushes and brooms:	
L. Briggs *	$816.18
a Rich	1,005.16
attan Supply Co	822.80
Turner	1,364.21
d Pemberton	1,094.33
S. Manning	837.88
Morrell & Co	849.85
Portland cement:	
. Neville	350.00
L. Briggs *	252.00
attan Supply Co	280.00
Palmann	319.00
Morrell & Co	290.00
Flax canvas:	
. Neville	112.12
attan Supply Co	107.25
Morrell & Co.*	99.00
Cotton canvas:	
. Neville	4,009.90
Sheridan & Co	3,365.65
C. Brokring	3,366.50
Morrell & Co	3,568.21
t Vernon Co.*	3,256.46
Bunting:	
e L. Neville	750.00
C. Brokring *	480.00
Morrell & Co	675.00
Glass:	
attan Supply Co	134.30
Swoyer & Co.*	115.20
Morrell & Co	160.70
Hardware:	
L. Briggs *	358.53
attan Supply Co	385.55
r Bros	434.08
Chesley & Co	366.66
Burtis	444.40
Belting and leather:	
e L. Neville *	24.90
L. Briggs	29.85
attan Supply Co	35.20
r Bros	34.00
Morrell & Co	40.10
White pine:	
Hodsdon	6,408.00
. Neville	11,310.00
Forsaith Machine Co	7,444.00
on & Pettinger	6,031.20
t Lumber Co	6,708.00
h W. Duryee	6,478.00
E. Pell *	5,991.90
-White ash:	
Hodsdon	1,287.50
L. Neville	1,200.00
on & Pettinger	1,115.00
t Lumber Co	1,150.00
h W. Duryee	1,175.00
E. Pell *	1,097.50
Class 11.—Yellow pine:	
C. F. Hodsdon	$1,395.00
Geo. L. Neville	3,060.00
Jesse I. Appinger	1,237.00
Watson & Pettinger	1,275.00
Export Lumber Co.*	1,085.00
Joseph W. Duryee	1,224.00
Chas. E. Pell	1,340.28
Class 12.—White oak:	
C. F. Hodsdon	1,256.25
Watson & Pettinger	1,083.00
Export Lumber Co.*	960.00
Chas. E. Pell	1,126.80
Class 13.—White cedar:	
C. F. Hodsdon	455.00
Geo. L. Neville	1,750.00
Watson & Pettinger	455.00
Joseph W. Duryee * †	455.00
Chas. E. Pell	476.00
Class 14.—Bar iron:	
Manhattan Supply Co	119.00
Oliver Bros	101.64
Henry S. Manning	96.00
A. P. Swoyer & Co.*	72.00
Class 15.—Packing:	
Fiske Bros	2,018.50
Manhattan Supply Co.*	1,889.20
Oliver Bros	1,941.25
Henry S. Manning	1,794.25
Mechanical Rubber Co	1,748.38
The New York Belting and Packing Co.*	1,720.29
Morse Burtis	2,334.50
Class 16.—Hose:	
New Jersey Car Spring and Rubber Co	795.00
Revere Rubber Co	1,000.00
S. C. Forsaith Machine Co	1,175.00
Fiske Bros	920.00
Harry L. Briggs	790.00
Aquila Rich	925.00
Manhattan Supply Co	805.00
Eureka Fire Hose Co.*	770.00
Mechanical Rubber Co	860.00
The Gutta Percha and Rubber Manufacturing Co	830.30
The New York Belting and Packing Co	850.60
Morse Burtis	970.00
Class 17.—Alcohol:	
Shoemaker & Busch	918.00
Aquila Rich *	892.00
Class 18.—White zinc:	
Aquila Rich *	223.60
A. W. Turner	230.00
Clifford Pemberton	238.00
Frederick M. Devoe	260.00
J. B. Morrell & Co	260.00
Chas. M. Childs & Co	230.00
Ira B. White	325.88

* Accepted. † By lot.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 19.—White lead:	
The Taylor Paint and Oil Co	$1,350.00
Aquila Rich	1,225.00
Clifford Pemberton*	1,188.00
Frederick M. Devoe	1,350.00
J. B. Morrell & Co	1,300.00
Chas. M. Childs & Co	1,200.00
Ira B. White	1,229.40
Chas. E. Ahrens	1,400.00
Wetherell & Bro	1,316.00
Class 20.—Varnishes:	
Shoemaker & Busch*	575.50
The Taylor Paint and Oil Co	707.50
Harry L. Briggs	827.50
Aquila Rich	648.50
A. W. Turner	1,050.00
Frederick W. Devoe	909.00
J. B. Morrell & Co	713.00
Chas. M. Childs & Co	750.00
Ira B. White	845.00
Brooklyn Varnish Manufacturing Co	837.50
Class 21.—Paints:	
Shoemaker & Busch	1,322.35
The Taylor Paint and Oil Co	1,340.50
Aquila Rich*	1,288.63
A. W. Turner	1,505.80
Clifford Pemberton	1,300.25
Frederick M. Devoe	1,521.20
J. B. Morrell & Co	1,566.75
Chas. M. Childs & Co	1,307.25
Class 22.—Turpentine:	
Geo. L. Neville	1,062.50
The Taylor Paint and Oil Co	975.00
Aquila Rich	899.25
A. W. Turner	1,050.00
J. B. Morrell & Co	987.50
Chas. M. Childs & Co.*	881.25
Class 23.—Linseed oil.	
Manhattan Oil Co	666.00
The Taylor Paint and Oil Co	702.00
Aquila Rich*	629.80
Class 23.—Linseed oil—Continued.	
A. W. Turner	$780.00
J. B. Morrell & Co	726.50
Chas. M. Childs & Co	654.00
Class 24.—L and B oil:	
Manhattan Oil Co.*	7,450.00
United Oil Co	10,000.00
Fiske Bros	7,665.00
Blivin & Carrington	10,000.00
Borne, Scrymser & Co	8,500.00
Class 25.—Lubricating oil:	
Manhattan Oil Co	532.50
United Oil Co	1,125.00
Fiske Bros.*	402.00
A. S. Holmes Co	435.00
Blivin & Carrington	525.00
Borne, Scrymser & Co	1,275.00
Class 26.—Cylinder oil:	
Manhattan Oil Co	925.00
United Oil Co	612.50
Fiske Bros.*	548.75
T. J. Gilroy & Co	600.00
A. W. Turner	750.00
A. S. Holmes Co	722.50
Blivin & Carrington	625.00
Borne, Scrymser & Co	561.25
Class 27.—Tools:	
Harry L. Briggs*	51.02
Manhattan Supply Co	62.06
Class 28.—Cotton waste:	
Geo. L. Neville	500.00
Fiske Bros	387.50
Harry L. Briggs	398.50
Manhattan Supply Co	385.00
Henry S. Manning*	384.50
J. B. Morrell & Co	395.00
Chas. E. Ahrens	390.00
Class 29.—Cement, etc.:	
Harry L. Briggs*	78.00
Manhattan Supply Co	150.40
J. B. Morrell & Co	132.75

Proposals for hoisting blocks for the navy-yard, Boston, Mass., under Bureau advertisement dated June 6, 1893; opened June 27, 1893.

Class 1.	
The Thomas Loughlin Co.*	$1,980.00
Southark Foundry and Machine Co.	2,723.00
Class 1—Continued.	
S. C. Forsaith Machine Co	$2,174.00
John Baizley	2,980.40

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated June 7, 1893; opened June 27, 1893.

Class 1:	
The Manhattan Supply Co	$378.00
B. Y. Pippey & Co.*	304.60
Harry L. Briggs	347.78
Peter Blank	318.00
J. B. Morrell & Co	338.00
Eugene L. Maxwell	366.00
Class 2	
The Manhattan Supply Co	725.55
B. Y. Pippey & Co	681.80
Harry L. Briggs	715.75
Peter Blank	680.75
J. B. Morrell & Co	698.95
Eugene L. Maxwell	756.00
Class 3:	
The Manhattan Supply Co	504.00
B. Y. Pippey & Co.*	469.00
Harry L. Briggs	476.35
J. B. Morrell & Co	494.37
Class 4:	
Henry C. Broking	1,700.00
J. B. Morrell & Co.*	1,212.50
Class 5:	
Wendell, Fay & Co.*	5,222.50
B. Y. Pippey & Co	5,250.00
Henry T. Kent	5,400.00
Class 6:	
Abraham Abraham	3,234.00
The Manhattan Supply Co	3,090.00
Wm. F. Bernstein	2,843.90
Class 6—Continued.	
J. W. W. Moyer	$2,813.00
B. Y. Pippey & Co	3,095.00
Thos. M. Farley*	2,800.00
Class 7:	
The Manhattan Supply Co	10,911.50
B. Y. Pippey & Co.*	10,450.00
S. W. Keith	10,721.87
Class 8:	
Wendell, Fay & Co	14,300.00
B. Y. Pippey & Co	15,450.00
Liberty Woolen Manufacturing Co.	14,975.00
Sullivan, Vail & Co.*	13,223.50
Class 9:	
Wendall, Fay & Co	10,887.00
B. Y. Pippey & Co	11,400.00
Sullivan, Vail & Co.*	10,248.50
Class 10:	
Wendell, Fay & Co	9,072.50
B. Y. Pippey & Co	10,400.00
Liberty Woolen Manufacturing Co.	9,225.00
Sullivan, Vail & Co.*	8,747.00
Class 11:	
Abraham Abraham*	1,974.00
The Manhattan Supply Co	2,010.00
J. B. Morrell & Co	2,031.00
Class 12:	
Anton Paimann	237.00
The Manhattan Supply Co	194.10
Wm. Wilson*	174.90

* Accepted.

Proposals for supplies for the New York navy-yard, etc.—Continued.

'aimann	$465.50
nhattan Supply Co	507.50
ppey & Co.*	399.00
Richter†	170.00
nhattan Supply Co	195.00
ilson*	191.25
Paimann	219.60
ian Rubber Comb Co.*	219.00
nhattan Supply Co	234.00
nhattan Supply Co.*	1,833.00
Gurney	1,900.50
rrell & Co	2,358.00
nhattan Supply Co	1,995.00
V. Paine	1,974.50
ockwell*	1,750.00
Gurney	1,795.00
nhattan Supply Co	4,962.50
McKeone*	4,843.75
nhattan Supply Co.*	15.00
Briggs	17.25
rrell & Co	16.00
Brothers	890.00
nhattan Supply Co	1,430.00
saith Machine Co.*	880.00
rnbergh*	42.00
nhattan Supply Co	57.00
oyer & Co	171.00
sonia Brass & Copper Co.*	161 50
rnbergh*	63.90
Bros	99.80
nhattan Supply Co	116.50
on C. Gill & Co	90.75
oyer & Co	67 20
L. Maxwell	85.60
ros	172.00
nhattan Supply Co	260.00
w Jersey Car Spring and r Co	99.00
w York Belting and Pack-.*	72.00

Class 24—Continued.

J. B. Morrell & Co	$208.00
Eugene L. Maxwell	111.30

Class 25:

Oliver Bros	69.75
Henry McShane Manufacturing Co.	60.55
The Manhattan Supply Co	71 00
S. C. Forsaith Machine Co	80.15
Morse Burtis	64.50
A. P. Swoyer & Co	59.00
Eugene L. Maxwell	64.30
E. T. Tweedy*	58.88

Class 26:

Henry McShane Manufacturing Co.	348.19
The Manhattan Supply Co	349.00
Morse Burtis	333.60
A. P. Swoyer & Co.*	328.80

Class 27:

Oliver Brothers	91.00
Henry McShane Manufacturing Co.	87.82
The Manhattan Supply Co	145.50
Morse Burtis	89.75
A. P. Swoyer & Co	170.50
Eugene L. Maxwell	86.95
E. T. Tweedy*	79.53

Class 28:

Fiske Brothers	62.50
Shoemaker & Busch	65.00
The Taylor Paint and Oil Co	62.50
The Walker Paint Co.*	58.75
Wetherell & Bro	63 30
Chas. M. Childs & Co	60.00
J. B. Morrell & Co	65.00

Class 29:

Fiske Brothers	46.60
Shoemaker & Busch	45.72
The Taylor Paint and Oil Co	47.63
Chas. M. Childs & Co.*	44.06
J. B. Morrell & Co	59.00

Class 30:

The Manhattan Supply Co	114.80
S. C. Forsaith Machine Co.:	
Bid A.*	100.00
Bid B	118.74
Bid C	137.50
Bid D	156.24
Bid E	125.00
Bid F	150.00
Bid G	181.24
Thompson C. Gill & Co	120.00
Eugene L. Maxwell	109.98

for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated June 19, 1893; opened July 5, 1893.

achine bolts:	
Neville	$139.85
nhattan Supply Co.*	130.42
ushes:	
Co	15.90
White	13.68
rrell & Co.*	11.64
ker & Busch	12.78
Neville	12.18
nhattan Supply Co	14.28
ment:	
oyer & Co.*	12.95
hite	13.20
saith Machine Co	16.05
Neville	17.40
nhattan Supply Co	19.50
lmore Manufacturing Co	14.00
nvass:	
Vernon Cro*	121.50
rrell & Co	126.00
Neville	130.50
nhattan Supply Co	141.00
lmore Manufacturing Co	150.00
lvanized sheet iron:	
hite & Co	452.40
oyer & Co	455.71
saith Machine Co	452.71
Neville*	406.98
nhattan Supply Co	471.48

Class 6.—Hair felt:

A. P. Swoyer & Co.*	$1,194.00
Ira B. White	1,321.66
S. C. Forsaith Machine Co	1,267.05
Geo. L. Neville	1,263.93
The Manhattan Supply Co	1,261.74
R. M. Gilmore Manufacturing Co	1,241.05

Class 7.—White lead:

Wetherell & Bro	61.38
Chas. M. Childs & Co.*	56.25
Ira B. White	56.70
J. B. Morrell & Co	59.62
Shoemaker & Busch	60.66
Geo. L. Neville	63.00
The Manhattan Supply Co	62.73
W. McBain & Co	58.50

Class 8.—Paints:

Chas. M. Childs & Co.*	85.77
Ira B. White‡	93.85
Shoemaker & Busch	86.51
Geo. L. Neville	105.50
W. McBain & Co	102.21

Class 9.—Electrical supplies:

Chas. Cory & Sons	2,303.69
Ira B. White	1,401.60
Geo. L. Neville	3,345.55
Western Electric Co.*	2,119.20

* Accepted. † Informal. ‡ Withdrawn.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

Class 10.—Machine bolts:	
E. V. White & Co	$12.72
A. P. Swoyer & Co.	9.78
Geo. L. Neville*	9.54
The Manhattan Supply Co	13.20
Class 11.—Hardware:	
Ira B. White	118.70
Geo. L. Neville	100.30
The Manhattan Supply Co.*	100.01
Class 12.—Marline, etc.:	
E. V. White & Co	44.10
Ira B. White	30.50
J. B. Morrell & Co	56.23
Geo. L. Neville	45.50
The Manhattan Supply Co.*	30.10
Class 13.—Lamps:	
Ira B. White	31.20
Geo. L. Neville	30.00
The Manhattan Supply Co.*	19.20
Class 14.—Tools:	
S. C. Forsaith Machine Co	87.16
Geo. L. Neville*	46.50
The Manhattan Supply Co	68.88
Class 15.—Metals:	
Geo. L. Neville*	65.90
The Manhattan Supply Co	70.43
Class 16.—Packing:	
Geo. L. Neville	289.50
The Manhattan Supply Co.*	173.85
Class 17.—Paints:	
Chas. M. Childs & Co	$78.20
E. V. White & Co	114.70
Ira B. White	88.42
Shoemaker & Busch	77.50
Geo. L. Neville	110.45
The Manhattan Supply Co	83.45
Class 18.—Valves:	
E. V. White & Co.*	14.05
Geo. L. Neville	47.00
The Manhattan Supply Co	23.52
Class 19.—Pipe and pipe fittings:	
E. V. White & Co	154.61
Ford & Kendig Co.*	134.01
A. P. Swoyer & Co	143.27
Geo. L. Neville	147.77
The Manhattan Supply Co	137.11
Class 20.—Gauges:	
Ford & Kendig Co.*	120.00
A. P. Swoyer & Co	136.80
S. C. Forsaith Machine Co	159.00
Geo. L. Neville	180.00
The Manhattan Supply Co	128.40
Class 21.—Stationery:	
Hume & Bilisoly*	31.53
Geo. L. Neville	74.20
Class 22.—Grate bars.†	
Class 23.—Tools:	
A. P. Swoyer & Co.*	57.06
Ira B. White	103.12
Geo. L. Neville	103.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated June 8, 1893; opened July 5, 1893.

Class 1.—Tube expanders:	
Eugene L. Maxwell	$152.00
Miller, Sloss & Scott	288.00
Dunham, Carrigan & Hayden Co.*	80.00
Class 2.—Mild bolt steel:	
Miller, Sloss & Scott	86.40
Dunham, Carrigan & Hayden Co.*	22.20
Class 3.—Tobins bronze:	
A. P. Swoyer & Co	637.20
The Ansonia Brass and Copper Co.*	496.49
Miller, Sloss & Scott	517.72
Class 4.—Pig tin:	
Miller, Sloss & Scott*	210.00
Class 5.—Seamless drawn copper pipe:	
Morse Burtis*	2,776.07
A. P. Swoyer & Co	3,243.86
Miller, Sloss & Scott	2,998.86
Dunham, Carrigan & Hayden Co	2,820.51
Class 6.—Sheet copper:	
Park Bro & Co	1,032.56
The Detroit Copper and Brass Rolling Mills*	1,005.55
Class 6.—Sheet copper—Continued:	
A. P. Swoyer & Co	$1,353.77
The Ansonia Brass and Copper Co.	1,039.48
Miller, Sloss & Scott	1,286.30
Dunham, Carrigan & Hayden Co	1,112.48
Class 7.—Charcoal iron:	
A. P. Swoyer & Co	1,473.30
Miller, Sloss & Scott	973.75
Dunham, Carrigan & Hayden Co.*	766.11
Class 8.—Pipe fittings:	
Morse Burtis	2,195.80
Geo. H. Tay Co	3,640.84
Miller, Sloss & Scott	2,834.56
Dunham, Carrigan & Hayden Co.*	1,672.23
Class 9.—Hammock bag duck:	
Harry C. Broking*	2,009.10
The Mount Vernon Co	2,100.00
Class 10.—Cotton canvas:	
Harry C. Broking	2,752.35
The Mount Vernon Co.*	2,588.65
Class 11.—Cotton twine†	

Schedule of proposals for supplies for the New York navy-yard under Bureau advertisement dated June 22, 1893; opened July 8, 1893.

Class 1.—Electrical supplies:	
The Western Electric Co	$1,968.49
Charles Cory & Son	2,162.60
Thompson C. Gill & Co.†	
Class 2.—Molding sand:	
Harry L. Briggs*	197.00
Class 2—Continued.	
The Manhattan Supply Co	$234.00
Class 3.—Pig iron:	
Eugene L. Maxwell*	874.80
Thompson C. Gill & Co	978.00

Schedule of proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated June 21, 1893; opened July 8, 1893.

Class 1.—Castings:	
The Standard Steel Casting Co	$707.20
Penn Steel Casting and Machine Co.*	558.60
The Midvale Steel Co	1,088.00
Class 2.—Forgings.	
The Bethlehem Iron Co.*	28.00
The Midvale Steel Co	44.80
Class 3.—Forgings:	
The Bethlehem Iron Co.*	$930.75
The Midvale Steel Co	1,077.30
Class 4.—Pulleys.	
Walter L. Clark*	668.25
A. P. Swoyer & Co	712.45
George L. Neville	750.00
The Manhattan Supply Co	763.42
Class 5.—Forgings:	
The Midvale Steel Co.*	563.16

* Accepted.

† Open purchase.

Schedule of proposals for coal for the U. S. naval hospitals, etc., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 1.—Naval hospital, Portsmouth:	
J. Albert Walker*	$208.25
Wm. H. Sise	315.00
Samuel G. French	241.50
Class 2.—Naval hospital, Widows Island, Maine:	
Samuel G. French*	192.00
Class 3.—Naval hospital, Chelsea, Mass.:	
Samuel G. French	977.00
J. E. Lewis & Co.*	889.00
Charles A. Campbell	891.50
David Duncan & Son	1,050.00
Class 4.—Naval hospital, Brooklyn, N. Y.:	
Samuel G. French*	3,640.75
David Duncan & Son	3,784.75
Peale, Peacock & Kerr	3,799.50
Barber & Zeigler	3,684.75
David S. Wells	3,738.00
Class 5.—Naval hospital, Philadelphia, Pa.:	
Samuel G. French	2,066.00
Charles D. Norton & Co	2,035.00
Frank F. Mathers*	1,951.50
McBride Bros	2,050.00
J. B. Van Dusen, jr	2,048.50
Thomas McConnell	2,250.00
David Duncan & Son	2,133.00
Peale, Peacock & Kerr	1,972.00
David S. Wells	2,199.00
Class 6.—Naval dispensary, League Island, Pennsylvania:	
Frank F. Mathers	28.75
J. B. Van Dusen, jr.*	27.50
Thomas McConnell	28.75
Peale, Peacock & Kerr	29.75
Class 7.—Naval hospital, Washington, D. C.:	
George L. Sheriff*	497.70
J. Edward Chapman	511.20
Class 8.—Naval dispensary, Washington, N. Y., Navy Yard:	
Geo. L. Sheriff*	$45.20
J. Edward Chapman	47.84
Class 9.—Museum of Hygiene, Washington:	
George L. Sheriff*	264.00
J. Edward Chapman	274.00
Class 10.—Naval hospital, Norfolk, Va.:	
Geo. W. Taylor & Co	2,660.00
Nottingham & Wrenn*	2,285.00
Paul C. Trugien	2,445.00
W. & J. Parker	2,400.00
David Duncan & Son	2,435.00
Peale, Peacock & Kerr	2,315.00
Class 11.—Naval dispensary, Norfolk navy-yard:	
Nottingham & Wrenn	41.65
W. & J. Parker*	38.85
Class 13.—Naval hospital, Mare Island, California:	
John Rosenfeld	3,178.00
R. D. Chandler	2,940.00
J. McDonough & Co	3,325.00
Wm. Walker	3,570.00
John L. Howard*	3,164.00 / 2,660.00
R. Dunsmuir & Son	3,234.00
Husband & Brooks	2,936.50 / 3,216.50
Class 14.—Naval hospital, Mare Island:	
John Rosenfeld	126.00
R. D. Chandler	130.00
Wm. Walker	137.50
John L. Howard*	114.90 / 94.90
Husband & Brooks	114.90 / 114.90

Proposals for fuel for the navy-yard, Portsmouth, N. H., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 1:	
Samuel G. French	$10,080.00
Wm. H. Sise	12,134.50
J. Albert Walker*	9,894.00
Peale, Peacock & Kerr	9,973.50
David S. Wells	10,153.50
David Duncan & Son	10,634.00
Class 2:	
Samuel G. French	2,972.90
Wm. H. Sise	3,532.00
J. Albert Walker	3,082.50
Peale, Peacock & Kerr*	2,890.70
David Duncan & Son	3,178.40
Class 3:	
Samuel G. French	340.00
Wm. H. Sise	450.00
J. Albert Walker*	280.00
David S. Wells	372.50
Class 3—Continued.	
David Duncan & Son	$374.00
Class 4:	
Samuel G. French	2,540.00
Wm. H. Sise	3,250.00
J. Albert Walker	2,625.00
Peale, Peacock & Kerr	2,745.00
David S. Wells	2,715.00
David Duncan & Son	2,320.00
Class 5:	
Samuel G. French	81.60
Wm. H. Sise	81.00
J. Albert Walker*	71.40
Class 6:	
Wm. G. Brown*	70.00
Samuel G. French	98.00
Imperial Pine Product Co	105.00
Hamilton Bros	87.50

Proposals for fuel for the navy-yard, Boston, Mass., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 7:	
Samuel G. French	$8,568.00
Charles A. Campbell	8,636.00
J. Albert Walker	9,170.50
Peale, Peacock & Kerr*	8,483.00
J. E. Lewis & Co	8,755.00
Curran & Burton	9,163.00
David S. Wells	8,653.00
David Duncan & Son	8,738.00
Edward B. Townsend	8,500.00
Class 8.	
Samuel G. French	6,855.50
Charles A. Campbell	7,086.00
J. Albert Walker & Co	7,540.00
Peale, Peacock & Kerr	7,221.00
J. E. Lewis & Co	7,467.50
Curran & Burton	8,067.50
Class 8—Continued.	
David S. Wells	$7,228.50
David Duncan & Son	7,453.00
Edward B. Townsend*	6,800.00
Class 9:	
Samuel G. French	87.00
Charles A. Campbell*	66.00
J. Albert Walker	75.00
J. E. Lewis & Co	79.20
Class 10:	
Samuel G. French	1,221.40
J. Albert Walker & Co	1,306.70
Peale, Peacock & Kerr	1,252.40
Curran & Burton†	
David Duncan & Son*	1,190.40
Edward B. Townsend	1,205.90

* Accepted. † Informal.

Proposals for fuel for the navy-yard, Boston, Mass., etc.—Continued.

Class 11:	
Samuel G. French	$11,760.00
J. Albert Walker & Co	12,150.00
Peale, Peacock & Kerr	11,310.00
Curran & Burton	12,090.00
David Duncan & Son	11,070.00
Edward B. Townsend*	11,070.00
Class 12:	
Wm. G. Brown	50.00
Samuel G. French	60.00
Class 12—Continued.	
Imperial Pine Product Co	$50.00
Hamilton Bros	66.00
Taylor P. Thompson*	28.00
Class 13:	
Wm. G. Brown*	176.00
Samuel G. French	243.00
Charles A. Campbell	192.00
Taylor P. Thompson	201.10

Proposals for fuel for the naval torpedo station, Newport, R. I., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 14:	
Samuel G. French	$1,016.00
Peale, Peacock & Kerr	1,034.00
David S. Wells*	992.00
David Duncan & Son	996.00
Class 15:	
Samuel G. French	6,999.00
Peale, Peacock & Kerr	7,180.00
Class 15—Continued.	
David S. Wells	$6,885.00
David Duncan & Son*	6,865.00
Class 16:	
Samuel G. French	448.00
Peale, Peacock & Kerr	775.00
David Duncan & Son	440.00

Proposals for fuel for the Naval War College, Newport, R. I., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 17:	
Samuel G. French*	$1,016.00
Peale, Peacock & Kerr	1,064.00
David S. Wells	1,240.00
Class 17—Continued.	
David Duncan & Son	$1,083.00
Class 18:	
Samuel G. French*	49.20

Proposals for fuel for the naval training station, Newport, R. I., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 19:	
Samuel G. French*	$2,988.50
Peale, Peacock & Kerr	3,132.50
David S. Wells	3,114.75
David Duncan & Son	3,040.00
Class 20:	
Samuel G. French	5,073.50
Peale, Peacock & Kerr	5,283.00
Class 20—Continued.	
David S. Wells	$5,181.25
David Duncan & Son*	4,976.00
Class 21:	
Samuel G. French†	19.50
Class 22:	
Samuel G. French*	3.36
Imperial Pine Product Co	5.40

Proposals for fuel for the navy-yard, New York, under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 23:	
Samuel G. French	$31,349.15
Peale, Peacock & Kerr	32,630.95
Barber & Ziegler*	30,639.25
David S. Wells	31,561.45
Moquin & Offermann	31,251.25
David Duncan & Son	31,869.10
Class 24:	
Samuel G. French	1,867.00
Peale, Peacock & Kerr	1,838.00
David S. Wells	1,966.00
Moquin & Offerman*	1,760.00
David Duncan & Son	1,810.00
Class 25:	
Samuel G. French	2,135.00
Peale, Peacock & Kerr	2,220.00
Barber & Ziegler*	2,085.00
David S. Wells	2,145.00
Moquin & Offermann	2,125.00
David Duncan & Son	2,185.00
Class 26:	
Samuel G. French	30,400.00
Clearfield Bituminous Coal Corporation*	30,900.00
The Davis Coal and Coke Co.:	
Bid A	32,900.00
Bid B	30,800.00
The Berwind White Coal Co	31,500.00
Class 26—Continued.	
Peale, Peacock & Kerr	$29,850.00
David Duncan & Son	29,400.00
Class 27:	
Samuel G. French	14,035.68
Clearfield Bituminous Coal Corporation	(‡)
The Davis Coal and Coke Co.:	
Bid A	14,774.40
Bid B*	13,953.60
The Berwind White Coal Co	14,555.00
Peale, Peacock & Kerr	14,097.24
David Duncan & Son	13,976.96
Class 28:	
Samuel G. French	356.40
The Davis Coal and Coke Co.*	312.00
Vandewater Coal Co	405.00
Peale, Peacock & Kerr	388.20
Henry S. Manning	373.20
Class 29:	
Sam G. French	547.80
Imperial Pine Product Co	514.60
John McConnell*	481.40
Hamilton Bros	831.60
Daniel Bertolet	562.74
Class 30:	
Samuel G. French	277.20
Max Morganstein*	265.20

*Accepted. † Open purchase; bid excessive. ‡ Informal.

Proposals for fuel for the navy-yard, League Island, Pennsylvania, under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 31:	
Peale, Peacock & Kerr	$5,017.55
Charles D. Norton & Co	(†)
J. B. Van Dusen, jr.*	4,831.00
Class 32:	
Peale, Peacock & Kerr	2,839.40
Charles D. Norton & Co	2,792.00
Thomas McConnell	3,492.50
J. B. Van Dusen, jr.*	2,750.50
Class 33:	
Peale, Peacock & Kerr	$1,414.75
Thomas McConnell	1,713.80
J. B. Van Dusen, jr.*	1,343.00
Class 34:	
Imperial Pine Product Co.*	7.50
Charles J. Field	8.50

Proposals for fuel for the Naval Academy, Annapolis, Md., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 35:	
John B. Flood	$966.00
Lynah & Read*	930.00
Peale, Peacock & Kerr	978.00
David Duncan & Son	1,108.00
Joseph S. M. Basil	958.00
Henry B. Myers	994.00
Class 36:	
William J. Lewis	11,900.00
William L. Read	11,550.00
The Davis Coal and Coke Co.*	10,990.00
Lynah & Read	11,305.00
Peale, Peacock & Kerr	12,215.00
David Duncan & Son	11,690.00
Class 37:	
William J. Lewis	4,170.00
William L. Read	4,150.00
Lynah & Read	3,980.00
Peale, Peacock & Kerr	4,140.00
Westmoreland Coal Co.*	3,810.00
Class 37—Continued.	
David Duncan & Son	$4,240.00
Class 38:	
John B. Flood	114.90
Lynah & Read*	139.50
Joseph S. M. Basil	143.70
Henry B. Myers	149.10
Class 39:	
William J. Lewis	1,360.00
William L. Read	1,320.00
The Davis Coal and Coke Co.*	1,256.00
Lynah & Read	1,352.00
Peale, Peacock & Kerr	1,396.00
David Duncan & Son	1,336.00
Joseph S. M. Basil	1,316.00
Class 40:	
John B. Flood*	195.00
Joseph S. M. Basil	200.40
Henry B. Myers	197.40

Proposals for fuel for the navy-yard, Washington, D. C., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 41:	
William J. Lewis	$3,000.00
William L. Read*	2,980.00
The Davis Coal and Coke Co	3,220.00
J. Edward Chapman	3,950.00
Peale, Peacock & Kerr	3,790.00
Johnson Brothers	3,450.00
Class 42:	
Wm. J. Lewis	3,000.00
Wm. L. Read*	2,980.00
The Davis Coal and Coke Co	3,220.00
J. Edward Chapman	3,950.00
Peale, Peacock & Kerr	3,790.00
Johnson Bros	3,450.00
Class 43:	
Wm. L. Read*	475.00
J. Edward Chapman	570.00
Peale, Peacock & Kerr	493.00
Class 44:	
Wm. J. Lewis	$24,000.00
Wm. L. Read*	23,840.00
The Davis Coal and Coke Co	25,760.00
J. Edward Chapman	31,120.00
Peale, Peacock & Kerr	30,320.00
Johnson Bros	27,600.00
Class 45:	
J. Edward Chapman*	90.00
Class 46:	
Imperial Pine Product Co	1,400.00
J. Edward Chapman	5,000.00
Geo. L. Neville	2,500.00
John F. Clark*	1,100.00
Class 47:	
D. C. Alexander	1,350.00
J. Edward Chapman*	1,009.50
Geo. L. Neville	1,800.00
Johnson Bros	1,014.00

Proposals for fuel for the navy-yard, Norfolk, Va., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 48:	
Nottingham & Wrenn Co	$1,786.50
Geo. W. Taylor & Co	1,867.50
Wm. J. Parker*	1,749.75
S. W. Niemeyer	2,382.50
Class 49:	
Nottingham & Wrenn Co.*	469.30
Peale, Peacock & Kerr	516.20
Wm. J. Parker	493.25
S. W. Niemeyer	647.50
Class 50:	
Nottingham & Wrenn Co	16,042.50
Peale, Peacock & Kerr	15,996.00
Pocahontas Coal Co.*	14,647.50
Class 51:	
Nottingham & Wrenn Co	$18,314.00
Pocahontas Coal Co.*	18,758.00
Class 52:	
Nottingham & Wrenn Co.*	713.70
George L. Neville	780.00
Class 53:	
George L. Neville*	68.60
S. W. Niemeyer	77.50
Class 54:	
Imperial Pine Product Co.*	188.50
George L. Neville	227.37
A. A. Bass	201.50

Proposals for fuel for the navy-yard, Pensacola, Fla., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 55:	
Frederick Bauer	$105.00
Benjamin Dolphin*	97.50

* Accepted. † Informal.

Proposals for fuel for the navy-yard, Mare Island, Cal., under Bureau advertisement dated June 20, 1893; opened July 15, 1893.

Class 56:	
John Rosenfeld	$43,440.00
Husband & Brooks:*	
Bid A	40,440.00
Bid B	44,344.00
J. McDonough & Co.:	
Bid A	50,100.00
Bid B	51,900.00
Bid C	48,600.00
R. Dunsmuir & Son	40,860.00
John L. Howard	43,920.00
Class 57:	
John Rosenfeld	23,635.50
Husband & Brooks:*	
Bid A	22,450.90
Bid B	24,130.90
J. McDonough & Co.:	
Bid A	26,697.00
Bid B	27,537.00
Bid C	(†)
R. Dunsmuir & Son	22,609.50
Class 57.—Continued.	
John L. Howard	$24,138.50
Class 58:	
John Rosenfeld	605.00
Husband & Brooks*	552.00
J. McDonough & Co	600.00
Wm. Walker	687.50
John L. Howard:	
Bid A	474.50
Bid B	574.50
Class 59:	
Husband & Brooks*	208.40
J. McDonough & Co	218.00
Wm. Walker	225.00
John L. Howard	258.00
Class 60:	
Wm. Walker*	252.00
Class 61:	
R. J. R. Aden*	315.00
Wm. Walker	387.50

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated June 27, 1893; opened July 15, 1893.

Class 1.—Wheat flour, 70,000 pounds:	
John J. O'Rorke	$1,431.00
A. Hatfield, jr	1,343.00
Chas. I. Goodwin & Son	1,370.00
Thos. E. McCarty*	1,311.22
Rowland & Co	1,428.00
Charles E. Ahrens	1,330.00
The Manhattan Supply Co	1,370.00
Class 2.—Salt pork, 100,000 pounds:	
Charles F. Mattlage*	10,730.00
Figge & Bro	11,190.00
Class 3.—Salt beef, 50,000 pounds:	
Charles F. Mattlage	.05 97/100
Charles E. Ahrens	.06 80/100
Class 4.—Rice, 13,000 pounds:	
John J. O'Rorke*	.03 47/100
A. Hatfield, jr	.03 97/100
Wm. J. Griffiths	.04
Chas. E. Ahrens	.03 73/100
Class 5.—Raisins, 21,000 pounds:	
John J. O'Rorke*	.06 80/100
A. Hatfield, jr	.06¾
Chas. E. Ahrens	.07
Class 6.—Prunes, 1,600 pounds:	
John J. O'Rorke*	.16 37/100
Charles E. Ahrens	.17 80/100
Class 7.—Corned beef, 8,000 pounds:	
Charles E. Ahrens*	.07 15/100
Class 8.—Ham, 3,500 pounds:‡	
Class 9.—Green coffee, 100,000 pounds:	
John J. O'Rorke*	.21 57/100
A. Hatfield, jr	.23
Class 9.—Green coffee, 100,000 pounds—Continued:	
W. H. Belford	90.21 81/100
Chas. E. Ahrens	.21 16/100
Class 10.—Tea, 2,000 pounds:	
John J. O'Rorke	.24 97/100
A. Hatfield, jr	.25 77/100
W. H. Belford	.31½
Chas. E. Ahrens	.22 10/100
John S. Sloan	.23 14/100
Class 11.—Sugar, 102,000 pounds:	
John J. O'Rorke	6,300.00
A. Hatfield, jr	6,300.00
Charles E. Ahrens	6,400.00
The Manhattan Supply Co.*§	6,300.00
Class 12.—Vinegar, 1,200 gallons:	
John J. O'Rorke*	128.76
F. Fochreubach & Co.*	139.20
Charles E. Ahrens	136.80
Class 13.—Corn meal, 3,000 pounds:	
John J. O'Rorke*	83.70
A. Hatfield, jr	97.50
Class 14.—Oatmeal, 4,000 pounds:	
John J. O'Rorke*	155.60
A. Hatfield, jr	180.00
Charles E. Ahrens	168.00
Class 15.—Beans, [illegible] 000 pounds:	
John J. O'Rorke*	387.50
Class 16.—Bacon, 3,000 pounds:	
Chas. F. Mattlage*	426.90
Class 17.—Electrical supplies:	
The General Electric Co.*	4,764.00
The Western Electric Co	7,985.37

Proposals for supplies for the New York navy-yard, under Bureau adertisement dated July 5, 1893; opened July 25, 1893.

Class 1.—Flannel lining, etc:	
The Manhattan Supply Co.*	$837.20
Class 2.—Spool cotton, black:	
The Manhattan Supply Co	126.75
Class 3.—Sewing silk:	
Anton Parmann*	308.70
Class 4.—Silk laces:	
Anton Parmann*	89.80
Class 5.—Rubber buttons:	
The Manhattan Supply Co.*	300.00
Class 6.—Bone buttons:	
The Manhattan Supply Co	57.60
Class 7.—Cap leathers:	
Oliver Bros.*	89.80
Class 8.—Steel air chambers.‖	
Class 9.—Steam pumps:	
George F. Blake Manufacturing Co.	11,040.00
Class 9.—Steam pumps—Continued:	
S. C. Forsaith Machine Co	$10,485.00
Marshall R. Davidson*	10,200.00
Class 10.—Air compressor:	
The Rand Drill Co.*	590.00
Class 11.—Fresh beef and vegetables:	
Oliver Bros.*	.06
	.00 13/100
Michael C. Heanan	.10
	.04
Michael Cleoner	.06¼
	.01¼
Belford & Morrison	.06¼
	.02¼
G. & B. Isaacs	.09
	.03
John Hanley	.06 3/16
	.01¼

* Accepted. † Informal. ‡ Informal; readvertised, bids opened August 8, 1893.
§ Decided by lot. ‖ Open purchase.

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated July 6, 1893; opened July 25, 1893.

Class 1.—Oil cans, etc.:	
George L. Neville	$18.00
The Manhattan Supply Co.*	16.32
A. P Swoyer & Co	18.00
Harry L. Briggs	18.00
Class 2.—Platform scales:	
George L. Neville	135.00
The Manhattan Supply Co.*	84.00
Thompson C. Gill & Co	159.00
The S. C. Forsaith Machine Co	125.80
A. P. Swoyer & Co	185.00
Class 3.—Tools:	
George L. Neville	778.04
The Philadelphia Machinery and Supply Co.*	395.80
The Manhattan Supply Co	571.87
The S. C. Forsaith Machine Co	532.67
A. P. Swoyer & Co	426.69
Harry L. Briggs	449.71
Class 4.—Rubber hose:	
George L. Neville	21.84
The Manhattan Supply Co.*	5.04
A. P. Swoyer & Co	8.70
Class 5.—Machine bolts:	
George L. Neville*	80.60
Thompson C. Gill & Co	139.35
J. H. Sternbergh	86.28
Class 6.—Hardware:	
George L. Neville*	90.36
The Manhattan Supply Co	99.70
Harry L. Briggs†	53.22
Class 7.—Tools:	
George L. Neville	72.00
Class 7.—Tools—Continued:	
The Philadelphia Machinery and Supply Co.*	$58.52
The Manhattan Supply Co	65.00
The S. C. Forsaith Machine Co	89.94
A. P. Swoyer & Co	68.69
Harry L. Briggs	62.78
Class 8.—Packing:	
George L. Neville	57.90
The Philadelphia Machinery and Supply Co	52.05
The Manhattan Supply Co	54.90
The Page Belting Co	63.00
Fiske Bros	66.00
The New Jersey Car Spring and Rubber Co.*	51.30
A. P. Swoyer & Co	64.50
Class 9.—Paints:	
George L. Neville	46.90
Shoemaker & Busch*	28.60
Chas. M. Childs & Co	32.49
Class 10.—Brass pipe and fittings:	
George L. Neville	24.66
The Manhattan Supply Co.*	19.50
Class 11.—Copper tubing:	
George L. Neville*	1,359.28
Morse Burtes†	1,303.71
Class 12.—Valves:	
George L. Neville	556.00
The Manhattan Supply Co.*	360.90
Class 13.—Steel air chambers.‡	
Class 14.—Air compressor:	
The Band Drill Co.*	590.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated June 30, 1893; opened July 25, 1893.

Class 1.—Brushes and brooms:	
Miller, Sloss & Scott‡	$282.20
Class 2.—Screws, etc.:	
Dunham, Carrigan & Hayden	579.45
Huntington Hopkins Co	582.96
Miller, Sloss & Scott	621.43
Baker & Hamilton*	551.69
Class 3.—Pump leather:	
Miller, Sloss & Scott*	49.00
Class 4.—Lumber:	
A. S. Carman*	1,141.25
Abraham Powell	1,182.00
William Walker	1,181.25
F. W. Kreling & Sons	1,201.00
Class 5.—Steel and iron:	
Dunham, Carrigan & Hayden Co.*	634.99
Miller, Sloss & Scott	712.94
Class 6.—Copper, zinc, etc.:	
Holbrook, Merrill & Stetson	395.40
Dunham, Carrigan & Hayden Co.*	596.80
Miller, Sloss & Scott	663.27
Class 7.—Packing:	
Fiske Bros	631.50
Miller, Sloss & Scott	710.75
Arnett & Rivers	628.13
The Bowers Rubber Co	672.00
H. T. Lally*	331.50
Class 8.—Leading hose:	
The Boston Woven Hose and Rubber Co	1,560.00
Fiske Bros	1,620.00
W. T. Y. Schenck	1,800.00
Arnett & Rivers	1,700.00
The New Jersey Car Spring and Rubber Co.*	1,180.00
The S. C. Forsaith Machine Co	1,740.00
The Bowers Rubber Co	1,560.00
H. T. Lally	1,600.00
Class 9.—Alcohol:	
F. N. Woods*	485.00
Class 10.—White lead:	
F. N. Woods*	287.50
Valentine & Co	343.75
Class 10.—White lead—Continued:	
Charles M. Childs & Co	$395.00
Charles M. Yates	300.00
Class 11.—Varnishes:	
F. N. Woods	232.50
Valentine & Co	309.25
Chas. M. Childs & Co.*	175.00
Chas. M. Yates	207.75
Class 12.—Pitch and turpentine:	
F. N. Woods*	285.00
Chas. M. Childs & Co	420.00
Chas. M. Yates	308.00
Class 13.—Paints:	
F. N. Woods*	664.39
Valentine & Co	767.92
Chas. M. Childs & Co	711.37
Chas. M. Yates	688.04
Class 14.—Tallow, etc.:	
Fiske Bros.*	93.50
Miller, Sloss and Scott	195.00
Chas. M. Childs & Co	165.00
Chas. M. Yates	99.50
Class 15.—Linseed oil:	
F. N. Woods* §	409.00
Chas. M. Childs & Co	468.00
Chas. M. Kates	409.00
Class 16.—Files:	
Dunham, Carrigan & Hayden Co	238.63
Huntington Hopkins Co.*	222.44
Miller, Sloss & Scott	240.23
Baker & Hamilton	246.99
Class 17.—Cotton waste:	
F. N. Woods	226.00
Dunham, Carrigan & Hayden Co	228.00
Huntington Hopkins Co.*	219.00
Miller, Sloss & Scott	220.00
Class 18.—Steel air chambers.‡	
Class 19.—Steam pumps:	
M. T. Davidson*	6,900.00
Geo. E. Dorr	11,100.00
The S. C. Forsaith Machine Co	7,590.00
Class 20.—Air compressor:	
The Rand Drill Co.*	590.00

* Accepted. † Informal. ‡ Open purchase. § Decided by lot.

Proposals for machine tools for the League Island navy-yard, under Bureau advertisement dated July 21, 1893; opened August 8, 1893.

Class 1.—1 engine lathe:	
Bement, Miles & Co.—	
Bid A	$14,500.00
Bid B	11,400.00
Bid C	13,800.00
The Niles Tool Works Co.*	8,985.00
William Sellers & Co	10,500.00
Henry S. Manning	12,285.00
The Manhattan Supply Co	16,100.00
Fitchburg Machine Works	10,248.00
Class 2.—1 milling machine:	
Bement, Miles & Co.*	$4,500.00
The Niles Tool Works Co.	5,375.00
Fitchburg Machine Works	4,750.50
Class 3.—1 open side planing machine:	
Bement, Miles & Co	4,000.00
The Niles Tool Works Co	1,984.00
Henry S. Manning*	1,900.00

Proposals for the supplies for the navy-yard, Washington, D. C., and naval proving ground, Indian Head, Maryland, under Bureau advertisement dated July 2, 1893; opened August 8, 1893.

Class 1.—40 tons bituminous coal:	
S. W. Niemeyer	$300.00
Geo. L. Neville	240.00
Peale, Peacock & Kerr*	205.60
Class 2.—120 tons anthracite coal:	
S. W. Niemeyer	840.00
George L. Neville	960.00
Peale, Peacock & Kerr	580.80
Class 3.—24 split pulleys:	
Henry S. Manning	173.76
The Manhattan Supply Co	153.60
Wm. Sellers & Co	140.88
Geo. L. Neville	360.00
Jos. R. Beatty*	109.68
A. P. Swoyer & Co	144.00
S. C. Forsaith Machine Co	130.56
Donegan & Swift	124.23
Bradford, Kennedy Sons & McGuire	124.32
Class 4.—50,000 ft. poplar:	
Geo. L. Neville	6,000.00
W. T. & F. B. Weaver*	2,435.00
Edwin J. Gaskill	2,550.00
S. C. Forsaith Machine Co	2,600.00
Class 5.—15,000 pounds copper wire:	
Henry S. Manning	2,239.50
The Manhattan Supply Co	2,025.00
Geo. L. Neville	3,750.00
W. T. & F. B. Weaver*	2,023.50
A. P. Swoyer & Co.	2,061.00
S. C. Forsaith Machine Co	2,125.50
Bradford, Kennedy Sons & McGuire	2,152.50
Class 6.—Seamless brass tubes:	
The Manhattan Supply Co.*	$1,397.65
The American Tube Works	1,405.87
Geo. L. Neville	1,467.53
A. P. Swoyer & Co	1,409.16
S. C. Forsaith Machine Co	1,448.63
Class 7.—Brushes, etc.:	
W. T. & F. B. Weaver*	33.10
J. H. Chesley & Co	33.60
Thompson C. Gill & Co	36.20
Class 8.—Linen braid.†	
Class 9.—1,500 pounds white lead:	
Wetherell & Bro	94.95
Chas. M. Childs & Co	93.00
Chas. Becker	99.00
Thompson C. Gill & Co	133.13
Smith, Kline & French Co.*	88.50
Hugh Reilly	96.00
Geo. Ryneal, jr	100.50
Shoemaker & Busch	101.10
Class 10.—1,500 gallons paraffin oil:	
Fiske Bros.*	119.10
The Manhattan Oil Co	142.50
Charles Becker	135.00
Standard Oil Co	123.75
George Ryneal, jr	150.00
Class 11.—100 gallons rape seed:	
Fiske Bros	68.90
The Manhattan Oil Co	64.50
Chas. M. Childs & Co.*	62.50
Chas. Becker	70.00
Smith, Kline & French Co	66.00
Geo. Ryneal, jr	69.00

Proposals for supplies for the Naval Academy, Annapolis, Md., under Bureau advertisement dated July 19, 1893; opened August 8, 1893.

Class 1.—Brick:	
S. W. Niemeyer	$480.00
George N. Potee	240.00
S. M. Hamilton & Co	306.00
Joseph S. M. Basil & Parlett	237.60
George L. Neville	300.00
The Calvert Brick Co.*	204.00
Daniel J. Sanders	237.60
Class 2.—Portland cement:	
S. W. Niemeyer	122.50
Shoemaker & Busch	108.50
S. M. Hamilton & Co.*	91.00
Joseph S. M. Basil & Parlett	96.25
Harry L. Briggs	104.65
George L. Neville	122.50
Daniel J. Sanders	106.75
Thompson C. Gill & Co	140.00
Morris Ebert	117.95
Smith, Kline & French Co	102.20
A. P. Swoyer & Co	103.95
Class 3.—Lime:	
S. W. Niemeyer	100.00
S. M. Hamilton & Co	64.00
Joseph S. M. Basil & Parlett*	54.00
George L. Neville	60.00
Daniel J. Sanders	56.00
Class 4.—Lime plaster:	
S. W. Niemeyer	175.00
S. M. Hamilton & Co	130.80
Joseph S. M. Basil & Parlett	109.40
Daniel J. Sanders*	80.80
Class 5.—Portland cement:	
S. W. Niemeyer	$280.00
Shoemaker & Busch	248.00
S. M. Hamilton & Co.*	208.00
Joseph S. M. Basil & Parlett	220.00
Harry L. Briggs	237.60
George L. Neville	280.00
Daniel J. Sanders	244.00
Thompson C. Gill & Co	320.00
Morris Ebert	252.00
Smith, Kline & French Co	233.60
A. P. Swoyer & Co	237.60
Class 6.—Slate:	
The Manhattan Supply Co	50.00
S. M. Hamilton & Co	55.25
Joseph S. M. Basil & Parlett	58.56
W. T. & F. B. Weaver	128.00
Geo. L. Neville	125.00
Thompson C. Gill & Co.*	47.93
Class 7.—Kitchen utensils:	
John E. A. Cunningham	63.90
The B. C. Bibb Stove Co	57.30
J. H. Chesley & Co.*	48.48
Joseph S. M. Basil & Parlett	76.74
Harry L. Briggs	64.20
Class 8.—Glass:	
Shoemaker & Busch*	20.40
Bradford, Kennedy Sons & McGuire	29.00
Geo. L. Neville	45.00
Thompson C. Gill & Co	35.90
A. P. Swoyer & Co	28.30

* Accepted.

† Open purchase.

ls for supplies for the Naval Academy, Annapolis, Md., etc.—Continued.

nber, white pine:	
Gill & Son	$778.12
. M. Basil & Parlett *	693.80
d F. B. Weaver	970.00
Neville	951.00
. Sanders	840.38
. Gaskill	850.50
mber, yellow pine:	
Gill & Son	322.50
. M. Basil & Parlett *	319.00
F. B. Weaver	514.00
Neville	565.00
. Sanders	770.00
. Gaskill	467.00
umber, poplar, etc.:	
Gill & Son *	291.00
d F. B. Weaver	331.00
. Gaskill	291.25
ipe, etc.:	
-Coles Engineer Co	442.81
nhattan Supply Co	494.70
. Briggs	435.80
weedy	471.45
woyer & Co	491.75
tove fixtures:	
A. Cunningham	150.60
C. Bibb Stove Co	187.98
nesley & Co.*	149.81
S. M. Basil & Parlett	155.63
Electrical supplies:	
nhattan Supply Co.*	23.60
Brushes, etc.:	
orrell & Co	201.75
ker & Busch	253.83
nhattan Supply Co	219.91
hesley & Co	193.66
S. M. Basil & Parlett *	224.09
L. Briggs *	193.59
woyer & Co	231.13
Dry goods:	
nhattan Supply Co	132.06
S. M. Basil & Parlett *	88.08
L. Briggs	107.68
Hardware:	
hesley & Co	105.58
S. M. Basil & Parlett *	99.37
L. Briggs	102.76
woyer & Co	137.46
Tin, iron, etc.:	
nhattan Supply Co	61.95
rd, Kennedy Sons & uire *	41.00
S. M. Basil & Parlett	47.90
son C. Gill & Co	43.38
woyer & Co	47.62

Class 19.—Hose, etc.:	
The Manhattan Supply Co	$61.60
Harry L. Briggs	31.40
A. P. Swoyer & Co. *	29.50
Class 20.—Paints:	
Aquila Rich	653.09
Shoemaker & Busch *	596.97
Chas. M. Childs & Co	616.96
Joseph S. M. Basil & Parlett	823.40
Clifford Pemberton	676.13
Hanline Bros	731.40
Smith, Kline & French Co	626.98
Class 21.—White lead:	
Wetherell & Bro	139.26
J. B. Morrell & Co	154.00
Aquila Rich	154.00
Shoemaker & Busch	148.28
Chas. M. Childs & Co	136.40
Joseph S. M. Basil & Parlett	136.40
Hanline Bros	141.90
Smith, Kline & French Co.*	129.80
Class 22.—Tools:	
Joseph S. M. Basil & Parlett	204.58
Harry L. Briggs *	139.84
A. P. Swoyer & Co	150.52
Class 23.—Cotton waste, etc.:	
Shoemaker & Busch	59.85
The Manhattan Supply Co	83.20
Joseph S. M. Basil & Parlett *	55.75
A. P. Swoyer & Co	68.55
Class 24.—Boilers:	
Donegan & Swift	6,915.00
Babcock & Wilcox Co	17,000.00
Ruggles-Coales Engineer Co	8,124.00
The E. Keeler Co	6,270.00
The Pennsylvania Boiler Works †	5,975.04
R. H. Hammond	9,535.32
S. C. Forsaith Machine Co	6,812.52
Cambell & Zell Co	6,828.54
The Ellicott Machine Co.*	6,198.00
Class 25.—Canvas: ‡	
J. B. Morrell & Co	65.65
The Manhattan Supply Co	78.20
Joseph S. M. Basil & Parlett	77.55
Geo. L. Neville	82.00
Class 26.—Lumber:	
Wm. D. Gill & Son *	41.50
W. T. & F. B. Weaver	72.50
Edwin A. Gaskill	77.50
Class 27.—Wheels:	
The Manhattan Supply Co.*	46.80
Thompson C. Gill & Co	80.00

for supplies for the navy-yard, New York and Norfolk, Va., under Bureau advertisement dated July 18, 1893; opened August 8, 1893.

000 plates rolled zinc:	
Brothers	$789.40
H. Woodruff & Co	1,430.00
Neville *	748.00
rsaith Machine Co	770.00
berger	1,490.00
loor and sketch plates New Norfolk:	
L. Neville *	2,575.08
Wrought-iron shapes, Norfolk:	
H. Woodruff & Co.*	228.25
ie Steel Co	283.71
Wrought-iron shapes:	
H. Woodruff & Co.*	228.25
ie Steel Co	283.71
blocks iron:	
son C. Gill & Co	52.16
woyer & Co.*	4.00
d, Kennedy Sons & McGuire	22.00
nhattan Supply Co	7.60
orrell & Co	6.00
olts and nuts:	
nhattan Supply Co.*	64.30
ernbergh & Co	72.75

Class 7.—Hardware:	
The Manhattan Supply Co	$187.15
Harry L. Briggs *	150.94
Class 8.—Fire bricks and fire clay:	
The Manhattan Supply Co.*	12.40
Class 9.—Hydrometer:	
Fiske Bros *	12.00
A. P. Swoyer & Co	23.76
The Manhattan Supply Co	14.40
Harry L. Briggs	12.96
Class 10.—Lamps, etc.:	
The Manhattan Supply Co	87.70
Wm. Porter's Sons	135.44
Harry L. Briggs *	82.46
Porter's Sons & Co	86.12
Class 11.—Belting:	
Frank H. Woodruff & Co	20.65
A. P. Swoyer & Co	19.00
Bradford, Kennedy Sons & McGuire	18.80
The Manhattan Supply Co	20.50
Geo. L. Neville *	14.60
Class 12.—Tools:	
The Manhattan Supply Co	287.35
Harry L. Briggs *	266.55

* Accepted. † Informal. ‡ No award.

Proposals for supplies for the navy-yard, New York and Norfolk, Va., etc.—Continued.

Class 13.—Metals:	
Thompson C. Gill & Co	$98.60
The Manhattan Supply Co.*	45.75
Class 14.—Zinc plates:	
Oliver Brothers	394.70
Frank H. Woodruff & Co	715.00
Geo. L. Neville *	374.00
S. C. Forsaith Machine Co	385.00
M. Lissberger	745.00
Class 15.—Steel, assorted:	
Frank H. Woodruff & Co	12.50
Thompson C. Gill & Co	20.00
Bradford, Kennedy Sons & McGuire:	
Bid A	20.00
Bid B	7.50
The Manhattan Supply Co.†	22.50
Anton Baumann	16.00
Class 16.—Gaskets and packing:	
Fiske Bros	329.20
The Manhattan Supply Co	422.10
The New Jersey Car Spring and Rubber Co.*	273.30
Class 17.—Paints:	
Clifford Pemberton	209.70
Fiske Bros	210.38
Smith, Kline & French Co	219.67
Bradford, Kennedy Sons & McGuire	223.28
The Manhattan Supply Co	240.30
Chas. M. Childs & Co.*	198.49
J. B. Morrell & Co	227.08
Class 18.—Pipe and fittings:	
A. P. Swoyer & Co	119.85
The Manhattan Supply Co.*	112.99
Class 19.—Valves:	
Fiske Bros *	158.40
The Manhattan Supply Co	177.12
The New Jersey Car Spring and Rubber Co	192.96
Class 20.—Oatmeal:	
The Manhattan Supply Co.*	487.00
J. B. Morrell & Co	82.00
Class 21.—Stationery:	
The Manhattan Supply Co.*	21.01
Class 22.—Tools:	
A. P. Swoyer & Co	192.18
The Manhattan Supply Co.*	164.54
Harry L. Briggs	176.44
Class 23.—Cotton duck:	
The Mount Vernon Co	$3,152.36
Chas. A. Frost *	2,961.00
The Manhattan Supply Co	3,223.40
J. B. Morrell & Co	3,109.78
Geo. L. Neville	3,549.25
G. K. Sheridan & Co	3,068.00
Class 24.—Cotton duck:	
The Mount Vernon Co	190.00
Chas. A. Frost	222.00
The Manhattan Supply Co	234.00
J. B. Morrell & Co	210.00
G. K. Sheridan & Co.*	181.50
Class 25.—Mattress ticking, hair, etc:	
The Manhattan Supply Co	713.50
J. B. Morrell & Co.*	685.00
Class 26.—Hardware:	
J. H. Chesley & Co	182.96
A. P. Swoyer & Co	199.86
Class 27.—White pine boards: †	
Class 28.—Sheet brass:	
Frank H. Woodruff & Co	50.92
A. P. Swoyer & Co	35.92
Bradford, Kennedy Sons & McGuire	38.36
The Manhattan Supply Co	36.68
Harry L. Briggs *	30.86
Class 29.—Paints:	
Clifford Pemberton	127.00
Fiske Bros	138.85
Smith, Kline & French Co	130.30
Bradford, Kennedy Sons & McGuire	139.00
The Manhattan Supply Co	161.50
Chas M. Childs & Co.*	116.10
J. B. Morrell & Co	135.80
Shoemaker & Busch	130.65
Class 30.—Alcohol:	
Smith, Kline & French Co.*	45.00
Bradford, Kennedy Sons & McGuire	45.60
Shoemaker & Busch	45.50
C ass 31.—Files:	
J. H. Chesley & Co.*	13.86
A. P. Swoyer & Co	15.37
Bradford, Kennedy Sons & McGuire	14.53
Harry L. Briggs	14.29
Class 32.—Bunting:	
J. B. Morrell & Co.‡	5,241.25
Class 33.—35,000 pounds ham:	
H. M. Anthony *	6,300.00

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated August 4, 1893; opened August 22, 1893.

Class 1.—Tools:	
S. C. Forsaith Machine Co	521.92
The Manhattan Supply Co	469.97
A. P. Swoyer & Co.*	393.29
Harry L. Briggs	428.73
Frank Clouds	443.62
Class 2.—Pasteboard:	
The Manhattan Supply Co	196.25
Frank Clouds *	78.75
Class 3.—Files:	
Henry Meyer & Co.*	62.48
F. P. May & Co	67.00
Class 4.—Chrome steel plate:	
Park Bros. & Co	468.50
The Midvale Steel Co.*	456.06
Class 5.—Steel castings, 4-inch:	
Receivers of the Norristown Steel Co	2,675.75
The Standard Steel Co	2,340.60
The Penn Steel Casting and Machine Co.*	1,482.05
The Solid Steel Co	1,578.70
Benj. Atha & Illingworth Co	2,889.81
The Midvale Steel Co	1,495.55
Class 6.—Portable crane and hoist:	
Frank Maris	250.00
Class 7.—Hand lathes:	
The Garvin Machine Co	180.00
The Manhattan Supply Co	264.00
Eugene L. Maxwell	240.00
The Lodge & Davis Machine Tool Co.*	170.00
Class 8.—Boring and drilling machine:	
Bement, Miles & Co.:	
Bid A	$3,000.00
Bid B	2,490.00
Eastern Branch Niles Tool Works:	
Bid A *	2,336.00
Bid B	2,900.00
Bid C	3,750.00
Class 9.—Engine lathes:	
The Garvin Machine Co	690.00
The Manhattan Supply Co	869.80
Eugene L. Maxwell *	598.00
Class 10.—Screw machines:	
The Garvin Machine Co	1,968.00
The Manhattan Supply Co	2,994.00
The Lodge & Davis Machine Tool Works*	1,900.00
Eastern Branch Niles Tool Works:	
Bid A	2,970.00
Bid B	2,300.00
Class 11.—Pulley blocks:	
The Manhattan Supply Co	324.00
Eugene L. Maxwell	156.00
Brown & Sharpe Manufacturing Co.	342.00
J. B. Morrell & Co	336.00
Frank Clouds *	137.94
Smith Courtney Co	216.00
Frank Maris	270.00
Class 12.—Radial drilling machine:	
Eugene L. Maxwell†	1,075.00
Bement, Miles & Co.:	
Bid A	1,890.00
Bid B *	1,590.00

* Accepted. † Open purchase. ‡ Readvertised, withdrawn.

posals for supplies for the navy-yard, Washington, D. C., etc.—Continued.

Continued.

rn Branch Niles Tool Works†	$1,415.00
H. Wanern	1,805.00
-Drill presses:	
arvin Machine Co.†	128.00
n & Sharpe Manufacturing Co*	628.00
odge & Davis Machine Tool	136.00
nt, Miles & Co	640.00
rn Branch Niles Tool Works†	130.00
Courtney Co.†	143.00
-Vertical drills:	
m Sellers & Co	1,700.00
nt, Miles & Co.*	1,650.00
& Eberhardt	1,750.00
rn Branch Niles Tool Works	
d A	1,688.00
d B	1,790.00
-Engine lathe:	
Manhattan Supply Co	797.00

Class 15—Continued.

Eastern Branch Niles Tool Works Co.*	$716.00

Class 16.—Milling machine:

S. C. Forsaith Machine Co	581.00
The Garvin Machine Co	537.00
Brown & Sharpe Manufacturing Co.:	
Bid A	516.00
Bid B	557.00
The States Machine Co	639.40

Class 17.—Steel castings, 13-inch:

Receivers of the Norristown Steel Co	27,690.33
The Standard Steel Co	19,079.69
The Penn Steel Casting and Machine Co	.06 7/8
The Solid Steel Co	24,234.29
Benjamin Atha & Illingworth Co.*	18,002.61
The Midvale Steel Co	19,851.04

ls for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated August 1, 1893; opened August 22, 1893.

Fire brick, etc.:

. Neville	$342.00
White*	234.10
A. Moore	279.78
Niemeyer	282.00
Kendall	241.53
Furnace cement:	
. Neville	350.00
White	184.00
B. Morgan	140.00
Swoyer & Co	84.00
Manhattan Supply Co	125.00
Gilmour Manufacturing Co.*	70.00
Pipe covering:	1,377.06
White	1,403.00
B. Morgan	1,101.80
Swoyer & Co	933.16
Manhattan Supply Co	1,273.24
L. Briggs	1,399.20
Gilmour Manufacturing Co.*	917.88
Pipe fittings:	
. Neville*	29.36
Forsaith Machine Co	38.84
Swoyer & Co	32.08
Manhattan Supply Co	33 10
Electric supplies:	
. Neville*	872.00
White	1,295.00
rn Electric Co	1,379.35
Electric supplies:	
White*	228.00
rn Electric Co	248.00
Wire:	
. Neville	518.60
White*	438.10
rn Electric Co	439.00
Bishop Gutta Percha Co.†	
Bell pulls, etc:	
White*	21.00
rn Electric Co	25.44
Yellow pine plank:	
. Neville*	3,250.80
S. Connor	3,290.00
-Galvanized steel plates:	
. Neville‡	1,253.28

Class 11.—Steel plates:‡

Class 12.—Steel angles and tee bars:‡

Class 13.—Bolts:

George L. Neville	$40.00
Ira B. White	42.50
Bradford Kennedy Sons & McGuire	29.50
J. H. Sternbergh*	25.50
Thompson C. Gill & Co	37.50

Class 14.—Screws:

Geo. L. Neville	168.23
Ira B. White	162.55
Bradford Kennedy Sons & McGuire	181.54
J. H. Chesley & Co	180.44
Chas. A. Moore	173.04
A. P. Swoyer & Co	171.93
Frank Clouds*	159.69
The Manhattan Supply Co	174.00
Harry L. Briggs	173.30

Class 15.—Black walnut:

Geo. L. Neville*	590.00

Class 16.—Sheet brass:

Geo. L. Neville	98.90
Bradford Kennedy Sons & McGuire	98.90
S. C. Forsaith Machine Co	106.42
J. B. Kendall	129.00
Frank H. Woodruff & Co.*	62.35
A. P. Swoyer & Co	84.92
The Manhattan Supply Co	94.60
Thompson C. Gill & Co	128.96

Class 17.—Wrought iron:‡

George L. Neville	31.68
Ira B. White	36.30
S. C. Forsaith Machine Co	39.19
J. B. Kendall	31.76
Frank H. Woodruff & Co.*	32.59
A. P. Swoyer & Co	31.35
The Manhattan Supply Co	36.30
Thompson C. Gill & Co	429.00

Class 18.—Angle iron:

George L. Neville	356.00
Ira B. White	142.65
S. C. Forsaith Machine Co	124.17
Frank H. Woodruff & Co	114.12
A. P. Swoyer & Co.*	67.54
The Manhattan Supply Co	116.85
Thompson C. Gill & Co	134.23

's for supplies for the navy-yard, New York, under Bureau advertisement dated August 2, 1893; opened August 22, 1893.

Hardware:

Manhattan Supply Co	$363.35
Morrell & Co.*	332.70
L. Briggs	365.20
Enameled cloth, etc.:	
e L. Neville	1,578.50
Manhattan Supply Co	1,051.00
Morrell & Co	1,136.50

Class 2—Continued.

Henry C. Broking*	$958.16
Harry L. Briggs	1,038.50

Class 3.—Solder:

George L. Neville	30.00
Henry McShane Manufacturing Co.*	22.25
The Manhattan Supply Co	28.00
Merchant & Co	26.00

* Accepted. † Informal. ‡ Open purchase.

Proposals for supplies for the navy-yard, New York, etc.—Continued.

Class 3—Continued.	
J. B. Morrell & Co	$31.00
Thompson C. Gill & Co	29.98
Class 4.—Gaskets:	
The Boston Woven Hose and Rubber Co.*	5.88
Fiske Bros	8.01
The Manhattan Supply Co	11.88
The New Jersey Car Spring and Rubber Co	6.24
J. B. Morrell & Co	10.44
The Gutta Percha and Rubber Manufacturing Co	7.68
Class 5.—Pipe, etc.:	
George L. Neville	225.36
S. C. Forsaith Machine Co	310.91
Morse Burtis	208.77
Henry McShane Manufacturing Co.	228.39
The Manhattan Supply Co	244.98
Chas. A. Moore	221.15
E. T. Tweedy*	195.08
Class 6.—Tools:	
The Manhattan Supply Co	15.28
Harry L. Briggs*	13.22
Class 7.—Ravens duck:	
The Manhattan Supply Co.*	244.80
J. B. Morrell & Co	272.00
Class 8.—Distance line:	
The Manhattan Supply Co	1,467.00
George L. Neville*	1,392.00
J. B. Morrell & Co.†	1,140.00
Harry L. Briggs	1,559.00
Class 9a.—Muslin:‡	
The Manhattan Supply Co	335.50
J. B. Morrell & Co	336.00
Henry C. Broking	329.50
Harry L. Briggs	322.50
Class 9b.—Sewing cotton, etc:‡	
William Wilson	368.82
The Manhattan Supply Co	377.76
Henry C. Broking	380.44
Harry L. Briggs	395.80
Class 10.—Paper bags:	
The Manhattan Supply Co	54.00
J. B. Morrell & Co.*	49.00
Class 11.—Gum camphor:	
Fiske Bros	145.50
The Manhattan Supply Co	162.00
Chas. H. Pleasants	154.50
Smith, Kline & French Co.*	140.62
Chas. M. Childs & Co	148.50
J. B. Morrell & Co	150.00
Harry L. Briggs	156.00
Thompson C. Gill & Co	153.00
Shoemaker & Busch	143.25
Class 12.—Burdens iron:	
George L. Neville	607.00
Joseph A. McKee§	522.55
The Manhattan Supply Co	624.00
Hannibal Green's Son & Co	(†)
A. P. Swoyer & Co	612.00
Class 13.—Tools:	
The Manhattan Supply Co	1,307.67
A. P. Swoyer & Co	1,514.80
Chas. A. Moore	1,605.23
Harry L. Briggs*	1,203.94
Class 14.—Hose:	
George L. Neville	75.00
The Boston Woven Hose and Rubber Co	43.20
S. C. Forsaith Machine Co	40.77
Fiske Bros	49.80
The Manhattan Supply Co	45.00
The New Jersey Car Spring and Rubber Co	46.86
J. B. Morrell & Co	44.40
The Gutta-Percha and Rubber Manufacturing Co.*	23.76
Class 15.—Handcart:	
The Manhattan Supply Co.*	34.90
Bradford, Kennedy Sons & McGuire	22.50
Class 16.—Pipe and boiler covering:	
Geo. L. Neville	$1,552.75
H. W. Johns Manufacturing Co	1,397.47
Wm. B. Morgan	1,242.26
The Manhattan Supply Co	1,409.89
Harry L. Briggs	2,043.24
R. M. Gilmour Manufacturing Co.*	1,031.83
Class 17.—Grate bars:	
S. C. Forsaith Machine Co	1,696.38
Frank H. Woodruff & Co.*	1,675.80
Chas. A. Moore	1,919.22
Thompson C. Gill & Co	2,946.24
Class 18.—Wrought iron plates:	
S. C. Forsaith Machine Co	66.24
Frank H. Woodruff & Co	60.48
Thompson C. Gill & Co.*	57.60
Class 19.—Wrought iron shapes:	
S. C. Forsaith Machine Co	519.79
Frank H. Woodruff & Co.*	495.34
Thompson C. Gill & Co	516.95
Class 20.—Wrought iron collars:	
J. H. Sternbergh*	266.80
S. C. Forsaith Machine Co	1,163.24
Class 21.—Bolts and nuts:	
Geo. L. Neville	88.50
J. H Sternbergh*	56.91
Class 22.—Fire brick:	
Geo. L. Neville	350.50
The Manhattan Supply Co	243.44
Charles H. Pleasants	255.16
Chas. H. Moore*	208.79
E. T. Tweedy	224.11
Harry L. Briggs	240.04
Class 23.—Lumber, white pine:	
Geo. L. Neville	1,520.00
Chas. E. Pell	870.10
Watson & Pittinger*	848.00
Class 24.—Lumber, ash:	
Chas. E. Pell*	126.00
Watson & Pittinger	130.50
Class 25.—Hardware:	
J. H. Chesley & Co	142.74
The Manhattan Supply Co.*	111.85
Harry L. Briggs	114.22
Class 26.—Tools:	
The Manhattan Supply Co	41.34
Chas. A. Moore*	31.96
Harry L. Briggs	38.29
Class 27.—Unbleached cotton duck:	
The Manhattan Supply Co	3,988.00
J. B. Morrell & Co.*	3,650.00
Henry C. Broking	3,776.00
Class 28.—Woolen socks:	
B. Z. Pippey & Co.*	6,350.00
Henry C. Broking	6,700.00
Class 29.—Brass and copper tubing:	
Geo. L. Neville	1,578.87
Morse Burtis*	1,476.77
The Manhattan Supply Co	1,506.90
A. P. Swoyer & Co	4,547.19
Merchant & Co	1,564.61
Class 30.—Soft-rolled sheet copper:	
Geo. L. Neville	844.98
Frank H. Woodruff & Co	893.73
The Manhattan Supply Co	886.35
A. P. Swoyer & Co	812.48
Merchant & Co	1,043.00
The Ansonia Brass and Copper Co.*	763.44
Park Bros. & Co	765.21
Bradford, Kennedy Sons & McGuire	824.29
Class 31.—Valves:	
Geo. L. Neville	1,293.56
S. C. Forsaith Machine Co	1,290.22
The Manhattan Supply Co	1,154.00
Chas. A. Moore	1,213.40
E. T. Tweedy	1,074.90
The Kennedy Valve Manufacturing Co.*	1,046.80

*Accepted. † Withdrawn. ‡ Readvertised by order of the Paymaster-General, August 25, 1893.
§ Informal.

for supplies for the navy-yard, Boston, Mass., under Bureau advertisement, dated August 3, 1893; opened August 22, 1893.

ardware:	
ε Wilde	$175.98
, Briggs*	164.38
er & Farquhar	239.73
nhattan Supply Co	196.35
lass.	
Neville	428.10
Kline & French Co.*	181 10
rsaith Machine Co	211.97
ε Wilde	220.80
voyer & Co	218.73
nhattan Supply Co	216.00
. Pleasants	216.76
ker & Busch	186.20
/hite lead:	
Kline & French Co.*	128.70
ell & Bro	139.26
& Cutler Corporation	277.07
Pemberton	130.46
orrell & Co	143.25
I. Childs & Co	136.40
. Pleasants	152.68
son C Gill & Co	167.75
ker & Busch	148.28
aints:	
Kline & French Co	280.21
Pemberton	293.74
Rich	291.04
I. Childs & Co.*	270 80
. Pleasants	314 29
ker & Busch	286.94
and:	
iemeyer	80.00
itler & Co.*	26.50
son C. Gill & Co	31.96
wine:	
Neville	460.00
iton & Co	541.00
& Wilde	498.50
L. Briggs	467.25
orrell & Co	483.00
nhattan Supply Co	480.00
ker & Busch*	407.75
anvas (flax):	
C. Broking	200.00
orrell & Co	192 00
nhattan Supply Co	200.40
anvas (hammock):	
Vernon Co	730.00
iton & Co	663.75
orrell & Co.*	637.50
nhattan Supply Co	692.50
lax (ravens):	
nton & Co	30.00
orrell & Co	25.00
nhattan Supply Co.*	21.00
Burlaps, etc.:	
L. Neville*	539.00
nhattan Supply Co	553.60
iteel wire:	
L. Neville	1,170.00
orsaith Machine Co	2,016.30
nhattan Supply Co.*	748 50
Leather belting:	
L. Neville	36.72
& Knight Manufacturing	
	36.00
& Wilde	42.40
F. Knowles*	33.00
er & Farquhar	41.50
orrell & Co	46.00
nhattan Supply Co	50.00
d, Kennedy Sons & McGuire	42.00
elting Co	35.00
rothers	37.50
White pine boards:	
& Abbott	190.00
orsaith Machine Co.*	157.00
Steel, tool, octagon:	
endall	202.40
IcDonald	316.20
& Wilde	308.60
nj. Atha & Illingworth Co.*	144.15
rother & Co., limited	150.54

Class 14—Continued.	
A. P. Swoyer & Co	$189.75
Frank H. Woodruff & Co	253.00
The Manhattan Supply Co	245.41
Bradford, Kennedy Sons & McGuire	175.77
Thompson C. McGill & Co	166.95
Class 15.—Pig iron.	
J. B. Kendall	207.25
P. F. McDonald	199.00
Bolles & Wilde*	183.25
E. P. Cutler & Co	190.50
Thompson C. Gill & Co	209.00
Class 16.—Packing:	
New Jersey Car Spring and Rubber Co.*	22.00
Bolles & Wilde	30.00
Harry L. Briggs	25.00
The Boston Woven Hose and Rubber Co	28.50
Chandler & Farquhar	23.00
Fiske Brothers	24.00
J. B. Morrell & Co	27.50
The Manhattan Supply Co	25.50
Class 17.—Hose:	
George L. Neville	230.00
Revere Rubber Co	199.00
S. C. Forsaith Machine Co	194.50
New Jersey Car Spring and Rubber Co.*	168.00
Bolles & Wilde	239.00
Harry L. Briggs	193.75
The Boston Woven Hose and Rubber Co	207.50
Henry F. Knowles	187.50
Aquila Rich	299.50
Fiske Brothers	246.50
J. B. Morrell & Co	256.50
The Manhattan Supply Co	260.00
The Gutta-Percha and Rubber Manufacturing Co	202.50
Eureka Fire Hose Co	180.00
Page Belting Co	244.00
Class 18.—Manila hemp:	
The Lawrence Cordage Co	17,920.00
Richard H. Wild	16,800.00
The Manhattan Supply Co:	
Bid A	17,490.00
Bid B*	16,490.00
Class 19.—Russian hemp:	
S. C. Forsaith Machine Co	9,425.0
Richard H. Wild	9,000.0
Class 20.—Whale oil.	
Smith, Kline & French Co	293.25
Bolles & Wilde	294.00
T. J. Gilroy & Co.*	276.00
Fiske Brothers	287.40
Chas. M. Childs & Co	304.50
Shoemaker & Busch	309.00
Class 21.—Alcohol:	
Smith, Kline & French Co.*	86.00
Shoemaker & Busch	91.80
Class 22.—Tar:	
George L. Neville	344.40
B. R. G. Loftus	300.00
Gould & Cutler Corporation	312.00
S. W. Niemeyer	414.00
Thompson C. Gill & Co	419 40
Shoemaker & Busch*	251.40
Class 23.—Pipe.	
S. C. Forsaith Machine Co.*	33.66
Bolles & Wilde	34.59
A. P. Swoyer & Co	34.98
The Manhattan Supply Co	38.01
Class 24.—Grommet rings:	
The Manhattan Supply Co	133.28
Class 25.—Soapstone:	
J. B. Kendall	120.00
S. C. Forsaith Machine Co	96.00
Bolles & Wilde	60.00
Harry L. Briggs*	55.50
The Manhattan Supply Co	63.00

* Accepted.

Proposals for supplies for the navy-yard, Boston, Mass., etc.—Continued.

Class 26.—Files:	
Bolles & Wilde	$109.44
Harry L. Briggs *	90.00
A. P. Swoyer & Co	129.46
Chandler & Farquhar	95.82
The Manhattan Supply Co	136.93
Class 27.—Soap, etc.:	
Bolles & Wilde	60.50
Gould & Cutler Corporation *	57.95
The Manhattan Supply Co	84.25
Class 27—Continued.	
E. P. Cutler & Co	$58.00
Class 28.—Cable iron:	
George L. Neville	24,000.00
J. B. Kendall	22,575.00
P. F. McDonald	21,070.00
Park, Brother & Co., limited †	9,331.00
A. & P. Roberts & Co.*	13,545.00
Frank H. Woodruff & Co	15,652.00

Proposals for supplies for the Naval Academy, Annapolis, Md., under Bureau advertisement dated August 16, 1893; opened September 5, 1893.

Class 1.‡	
Class 2.‡	
Class 3.‡	
Class 4.‡	
Class 5.—Carpets:	
W. B. Moses *	$793.25
Chas. H. Pleasant	909.41
Class 6.—Window shades:	
W. B. Moses *	67.50
Class 7.—Bedroom furniture:	
W. B. Moses *	268.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated August 5, 1893; opened September 5, 1893.

Class 1.—Galvanized iron:	
Frank H. Woodruff & Co	$217.51
S. C. Forsaith Machine Co	225.62
Holbrook, Merrill & Stetson *	208.99
Miller, Sloss & Scott	223.48
Class 2.—Angle iron:	
Frank H. Woodruff & Co	142.02
S. C. Forsaith Machine Co	150.27
Dunham, Carrigan & Hayden Co.*	141.84
Miller, Sloss & Scott	182.48
Class 3.—Angle steel:	
Frank H. Woodruff & Co	242.88
Dunham, Carrigan & Hayden Co.*	228.16
Miller, Sloss & Scott	364.32
Class 4.—Sheet iron:	
Miller, Sloss & Scott*	1,459.50
Class 5.—Sheet copper.	
Frank H. Woodruff & Co	1,762.20
Class 5—Continued.	
Park, Bro. & Co., Limited*	$1,451.41
S. C. Forsaith Machine Co	1,602.00
Dunham, Carrigan & Hayden Co	1,595.50
Holbrook, Merrill & Stetson	1,628.70
Miller, Sloss & Scott	1,949.10
Merchant & Co	1,602.60
Class 6.—Screws:	
Dunham, Carrigan & Hayden Co.*	61.00
Miller, Sloss & Scott	62.05
Class 7.—Teak:	
Wm. Walker*	530.00
Class 8.—Boiler covering:	
McDearmon & Co.*	1,146.59
H. W. Johns Manufacturing Co	1,552.53
S. C. Forsaith Machine Co	1,592.54
W. B. Morgan	1,247.16
Miller, Sloss & Scott	1,707.27

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated August 17, 1893; opened September 5, 1893.

Class 1.—Screws:	
W. T. & F. B. Weaver	$44.00
J. H. Chesley & Co.*	42.35
Chas. H. Pleasants	46.58
Class 2.—Yellow pine:	
W. T. & F. B. Weaver	346.88
Thos. W. Smith *	224.90
D. F. Merrill, jr	239.90
Geo. L. Neville	445.00
Class 3.—White pine.	
W. T. & F. B. Weaver	195.00
Thos. W. Smith *	147.00
D. F. Merrill, jr	165.00
Geo. L. Neville	270.00
Class 4.—Steel:	
Park Bro. & Co., Limited	1,575.00
J. B. Kendall *	1,552.50
The Midvale Steel Co	2,070.00
The Benj. Atha & Illingworth Co	1,845.00
Class 4.—Steel—Continued.	
Frank H. Woodruff & Co	$2,587.50
J. H. Sternbergh	1,897.50
Geo. L. Neville	5,520.00
Class 5.—Iron:	
J. B. Kendall *	541.00
A. P. Swoyer & Co	604.00
Frank H. Woodruff & Co	888.00
Thompson C. Gill & Co	566.40
J. H. Sternbergh	790.00
Geo. L. Neville	776.80
Class 6.—Castings:	
Standard Steel Casting Co	648.85
The Midvale Steel Co.* §	443.95
The Benj. Atha & Illingworth Co	546.40
The Penn Steel Casting and Machine Co	443.95
Solid Steel Co	478.10

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated August 31, 1893; opened September 19, 1893.

Class 1.—Brushes:	
Shoemaker & Busch	$30.69
Hanline Bros	26.45
The Manhattan Supply Co	29.90
John Lucas & Co	30.96
Norfolk Supply Co	23.50
McFadden Co.*	20.70
Harry L. Briggs	27.30
Ira B. White	26.00
George L. Neville	30.84
Chas. H. Pleasants	28.70
Class 2.—White lead:	
Smith, Cline & French Co. *§	$661.20
Shoemaker & Busch	768.36
Hanline Bros	723.87
Chas. M. Childs & Co	661.20
John Lucas & Co	712.50
Norfolk Supply Co	694.10
The Phœnix Paint Co	787.24
Ira B. White	683.88
Wetherell & Bro	721.62
Wm. W. Lawrence	669.75

* Accepted. † Informal. ‡ Open purchase. § Decided by lot.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

Continued.

L. Neville	$711.36
H. Pleasants	780.90
Paints:	
ı, Kline & French Co.*	699.65
naker & Busch	786.53
ne Bros	774.28
M. Childs & Co	716.85
Lucas & Co	775.30
lk Supply Co	735.26
'hœnix Paint Co	861.74
. White	710.95
erell & Bro.†	
W. Lawrence	756.09
L. Neville	759.66
H. Pleasants	844.84
White zinc:	
ı, Kline & French Co	608.00
naker & Busch*	511.36
M. Childs & Co	524.80
Lucas & Co	544.00
lk Supply Co	656.00
dden Co	658.00
. White	640.00
W. Lawrence	672.00
L. Neville	704.00
H. Pleasants	624.00
-Metallic paint:	
White & Co	90.00
ı, Kline & French Co	94.50
M. Childs & Co	95.00
dden Co	93.00
. White	89.00
L. Neville*	80.00
H. Pleasants	91.00
-Varnishes:	
ı, Kline & French Co	443.32
naker & Busch*	403.91
ne Bros	597.20
M. Childs & Co	468.30
Lucas & Co	583.83
lk Supply Co	613.75
'hoenix Paint Co	493.35
. White	457.75
W. Lawrence	577.70
ge L. Neville	548.70
H. Pleasants	505.75
Alcohol:	
ı, Kline & French Co	103.05
naker & Busch*	101.03
Oil:	
White & Co	297.00
ı, Kline & French Co.*	240.57
naker & Busch	262.35
M. Childs & Co	247.50
Lucas & Co	264.00
lk Supply Co	250.80
Phœnix Co	270.60
. White†	250.80
W. Lawrence	250.80
ge L. Neville	257.40
H. Pleasants	290.40
Turpentine.	
White Co	148.00
ı, Kline & French Co	132.27
naker & Busch*	123.90
M. Childs & Co	133.10
Lucas & Co	145.60
lk Supply Co	127.00
'hœnix Paint Co	157.40
. White	126.20
W. Lawrence	135.80
L. Neville	133.40
H. Pleasants	146.40
-Granulated cork:	
ı, Kline & French Co	152.07
naker & Busch	69.30
M. Childs & Co	308.00
dden Co.*	44.66
Kendall	92.40
. White	118.58
L. Neville	119.35
H. Pleasants	107.80

Class 11.—Bolts:	
The Manhattan Supply Co	$17.25
Ira B. White*	13.75
Geo. L. Neville	15.00
Class 12.—Bricks:	
S. W. Niemeyer	27.00
J. B. Kendall	50.00
Ira B. White*	21.25
Geo. L. Neville	25.00
Class 13.—Canvas:	
The Manhattan Supply Co	24.10
J. B. Kendall	27.50
Ira B. White*	16.15
Geo. L. Neville	23.75
Class 14.—Tin, bronze, etc.:	
E. V. White & Co	265.68
The Manhattan Supply Co.*	239.00
Donegan & Swift	256.78
McFadden Co	283.07
S. C. Forsaith Machine Co	239.24
George L. Neville	256.22
Class 15.—Sheet iron:	
E. V. White & Co	234.75
Frank H. Woodruff & Co	171.75
Ira B. White	223.62
S. C. Forsaith Machine Co	189.51
George L. Neville*	160.63
Class 16.—Sheet steel:	
E. V. White & Co	246.00
Frank H. Woodruff & Co.*	130.02
McFadden Co	144.95
J. B. Kendall	141.45
Ira B. White	152.52
S. C. Forsaith Machine Co	154.60
Carnegie Steel Co	138.37
Geo. L. Neville	228.95
Class 17.—Steel:	
E. V. White	148.40
The Manhattan Supply Co	92.75
McFadden Co	89.04
J. B. Kendall*	64.93
Ira B. White	102.02
S. C. Forsaith Machine Co	81.62
Geo. L. Neville	185.50
Class 18.—Asbestus:	
The Manhattan Supply Co	155.00
McFadden Co.*	78.00
S. C. Forsaith Machine Co	156.00
Geo. L. Neville	213.41
Chas. H. Pleasants	160.95
Class 19.—Boiler tubes:‡	
E. V. White	1,822.50
Frank H. Woodruff & Co	1,876.50
J. B. Kendall	1,890.00
The Walworth Manufacturing Co	1,188.00
S. C. Forsaith Machine Co	1,188.00
George L. Neville	1,674.00
Class 20.—Brass pipe:	
A. P. Swoyer & Co	604.90
The Manhattan Supply Co.*	604.89
Donegan & Swift	646.31
Cuyler & Mohler	716.04
The Walworth Manufacturing Co	643.61
S. C. Forsaith Machine Co	644.72
Wm. C. Cotton	604.90
Geo. L. Neville	653.43
Class 21.—Valves:	
E. V. White	65.46
The Manhattan Supply Co	89.22
McFadden Co	66.57
Cuyler & Mohler	181.45
Harry L. Briggs	69.92
The Walworth Manufacturing Co.*	62.44
Ira B. White	76.40
S. C. Forsaith Machine Co	70.05
Geo. L. Neville	111.50
Class 22.—Pipe fittings:	
E. V. White	278.38
A. P. Swoyer & Co	269.92
The Manhattan Supply Co	287.12
Donegan & Swift	267.89
McFadden Co	276.00
Cuyler & Mohler	309.40
Harry L. Briggs*	253.52
The Walworth Manufacturing Co	276.92

*Accepted. †Informal. ‡No award.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued

Class 22—Continued:	
E. T. Tweedy	$280.80
S. C. Forsaith Machine Co	303.71
Geo. L. Neville	333.21
Class 23.—Labor and material for covering boilers:	
Ira B. White*	1,989.50
Wm. B. Morgan†	1,116.00
Class 24.—Mahogany:	
Seaboard Lumber Co	2,650.00
Chas. S. Conner	2,320.00
James & Abbott	1,920.00
Edwin A. Gaskill	1,584.00
Geo. L. Neville*	1,280.00
Class 25.—Tin:	
E. V. White	450.00
Frank H. Woodruff & Co	425.25
The Manhattan Supply Co	414.00
Donegan & Swift	405.00
J. B Kendall	410.40
S. C. Forsaith Machine Co	409.50
Class 25—Continued:	
Geo. L. Neville*	$404.82
Charles H. Pleasants	432.00
Class 26.—Bolts, etc.:	
The Manhattan Supply Co	52.00
Harry L. Briggs	41.99
Ira B. White*	35.74
Geo. L. Neville	38.67
Class 27.—Tools:	
E. V. White	336.50
A. P. Swoyer & Co	281.19
The Manhattan Supply Co	247.06
McFadden Co.*	235.94
Harry L. Briggs	344.43
Philadelphia Machinery and Supply Co	261.42
J. B. Kendall	280.79
Ira B. White	327.00
S. C. Forsaith Machine Co	264.62
Geo. L. Neville	257.40

Proposals for supplies for the New York navy-yard under Bureau advertisement dated August 30, 1893; opened September 19, 1893.

Class 1.—5,000 pairs calfskin shoes:	
Watsontown Boot and Shoe Co	$7,400.00
George F. Roedel*	6,900.00
Class 2.—100,000 yards flannel:	
B. Y. Pippey & Co.*	89,875.00
Wendell, Fay & Co	101,850.00
Henry T. Kent	92,000.00
Class 3.—10,000 watch caps:	
Horstmann Bros. & Co.*	4,400.00
Class 4.—7,000 pounds evaporated apples:	
John J. O'Rorke	784.70
Chas. E. Ahrens*	763.00
Kemp, Day & Co	875.00
Class 5.—2,500 evaporated peaches:	
John J. O'Rorke*	214.25
Chas. E. Ahrens	262.50
Kemp, Day & Co	285.00
Class 6.—50,000 pounds tomatoes:	
John J. O'Rorke	2,115.00
Chas. E. Ahrens	2,000.00
Kemp, Day & Co.*	1,970.00
Class 7.—2,000 gallons sirup:	
John J. O'Rorke*	394.20
C. J. Caughey	466.60
Chas. E. Ahrens	480.00
Class 8.—45,000 pounds vegetables:	
John J. O'Rorke	2,826.00
C. J. Caughey*	2,587.50
Chas. E. Ahrens	2,925.00
Kemp, Day & Co	2,641.50
Class 9.—Muslin:	
The Manhattan Supply Co.*	317.00
Class 10.—Sewing cotton:	
The Manhattan Supply Co.*	355.22
William Wilson	368.82
Class 11.—Steel angles and shapes:	
Carnegie Steel Co.*	244.02
Class 12.—Steel plates:	
Carnegie Steel Co.*	$293.12
Class 13.—Galvanized plates:	
Carnegie Steel Co.*	532.[illegible]
Class 14.—White oak:	
Watson & Pittinger	948.00
Chas. E. Pell	972.[illegible]
C. I. Hodsdon*	868.90
Class 15.—Copper rod:	
The Manhattan Supply Co.*	18.00
Class 16.—Glass:	
The Manhattan Supply Co	202.60
J. R. Donnelly	259.90
John Lucas & Co	180.96
Shoemaker & Busch*	175.70
S. C. Forsaith Machine Co	176.98
Class 17.—White lead:	
Wm. W. Lawrence	117.50
John Lucas & Co	125.[illegible]
Chas. M. Childs & Co.*	116.[illegible]
Phœnix Paint Co	137.50
Smith, Kline & French Co	117.[illegible]
Clifford Pemberton	116.[illegible]
Shoemaker & Busch	134.[illegible]
Wetherell & Bro	126.60
S. C. Forsaith Machine Co	142.50
Class 18.—Paints:	
Wm. W. Lawrence	359.[illegible]
John Lucas & Co	373.[illegible]
Chas. M. Childs & Co	322.[illegible]
Phœnix Paint Co	397.[illegible]
The Phillips, Ferguson & Hanold Co.	356.[illegible]
Smith, Kline & French Co.*	304.[illegible]
Clifford Pemberton	315.[illegible]
Shoemaker & Busch	321.[illegible]
Class 19.—Alcohol:	
Smith, Kline & French Co.*	43.[illegible]
Shoemaker & Busch	44.90

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated September 11, 1893; opened September 26, 1893.

Class 1:	
The Manhattan Supply Co.*	$639.96
Aquila Rich	1,459.20
Clifford Pemberton	650.76
Harry L. Briggs	763.20
J. B. Morrell & Co	805.02
Hanlon & Goodman	1,320.96
Class 2:	
The Manhattan Supply Co	71.40
Harry L. Briggs	68.70
Eugene L. Maxwell*	65.82
Class 3:	
The Phœnix Paint Co	2,020.00
Wm. W. Lawrence	1,900.00
Aquila Rich	2,018.80
Smith, Kline & French Co.*	1,800.00
Manhattan Oil Co	1,980.00
Class 4:	
The Phœnix Paint Co	$732.50
Wm. W. Lawrence	660.00
Aquila Rich	760.00
Smith, Kline & French Co.*	589.85
Clifford Pemberton	725.00
Shoemaker & Busch	707.50
Chas. H. Pleasants	836.95
Chas. M. Childs & Co	740.50
S. Adler Sons	665.00
Class 5:	
The Allison Manufacturing Co.*	1,638.00
The S. C. Forsaith Machine Co	1,961.20
Morris Tasker & Co	1,680.00
Pancoast & Rogers	1,980.00

* Accepted. † Informal.

osals for supplies for the New York navy-yard, etc.—Continued.

tan Supply Co.*	$346.80
	381.00
	422.04
laxwell	351.60
. Gill & Co	406.76
rsaith Machine Co	42.00
tan Supply Co	36.00
iggs	28.00
ork Belting and Pack-	
	50.00
	250.00
laxwell	29.00
Jersey Car Spring and	
.*	25.00
tan Supply Co.*	410.00
iggs	429.50
l & Co	532.50
ttan Supply Co	92.00
iggs	84.00
	97.50
& Busch *	81.00
Vernon Co.*	128.90
ttan Supply Co	139.90
l Co	132.50
ttan Supply Co	27.00
iggs	27.00
	27.60
laxwell	24.60
tan Supply Co.*	317.60
en Hose and Rubber Co.	1,620.00

Class 13—Continued:	
The S. C. Forsaith Machine Co	$1,434.00
The Manhattan Supply Co	1,460.00
The New York Belting and Packing Co	1,500.00
Fiske Bros	1,600.00
Gutta-Percha and Rubber Manufacturing Co	2,000.00
The New Jersey Car Spring and Rubber Manufacturing Co	1,580.00
Class 14:	
The Manhattan Supply Co.*	269.00
Harry L. Briggs	307.50
Oliver Bros	300.00
Eugene L. Maxwell	295.00
Class 15:	
The Manhattan Supply Co.*	549.85
Harry L. Briggs	585.00
Class 16:	
The Manhattan Supply Co.*	2,088.00
Harry L. Briggs	2,355.00
Oliver Bros	2,190.00
Eugene L. Maxwell	2,151.00
Class 17:	
The Manhattan Supply Co.*	164.14
Harry L. Briggs	243.88
Class 18:	
The Manhattan Supply Co	150.00
Harry L. Briggs	109.00
Oliver Bros	107.00
Shoemaker & Busch *	90.00
Chas. H. Pleasants	110.00
Class 19:	
The Manhattan Supply Co	71.00
Smith, Kline & French Co	70.74
Oliver Bros	77.00
Shoemaker & Busch *	68.50
Chas. H. Pleasants	99.00
Eugene L. Maxwell	91.00

supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated September 7, 1893; opened September 26, 1893.

B. Weaver	$1,348.00
ll	1,344.00
h Machine Co	1,387.00
ttan Supply Co	1,450.00
a Brass and Copper Co.	1,350.00
Co	1,480.00
r & Co	1,350.00
teelman	1,343.00
ohn	1,350.00
nes *	1,325.00
B. Weaver	9,752.00
Smith	10,140.00
h Machine Co	10,468.40
askill	9,890.00
her & Bro.*	8,855.00
h Machine Co	1,006.22
ttan Supply Co	1,137.18
iggs	932.12
Co.*	905.29
ds	918.16
lelphia Machinery and	948.06
e Steel Co.*	87.60
ille	300.00
yer	225.00
ll*	141.00
ttan Supply Co	162.35
B. Weaver	10,500.00
ll*	10,175.00
h Machine Co	10,590.00
ohn	10,240.00
an Metal Co	10,280.00
nes	10,500.00
Neville	2,214.00
B. Weaver	2,295.00

Class 7—Continued:	
J. B. Kendall * †	$2,170.00
S. C. Forsaith Machine Co	2,260.00
Jesse Lewisohn	2,200.00
The American Metal Co	2,170.00
Class 8:	
Chas. Becker	232.70
Geo. Ryneal, jr	216.52
J. B. Kendall	233.70
The Manhattan Supply Co	311.70
Harry L. Briggs *	194.15
Chas. M. Childs & Co	213.30
McFadden Co	247.15
Class 9:	
Chas. Becker	117.50
J. B. Kendall	111.60
Harry L. Briggs	95.38
McFadden Co.*	67.77
Class 10:	
George L. Neville	396.90
Thompson C. Gill & Co	352.50
Charles Becker	397.50
J. B. Kendall	298.50
S. C. Forsaith Machine Co	286.50
The Manhattan Supply Co.*	270.00
Shoemaker & Busch	411.00
McFadden Co	313.50
Frank Clouds	285.00
Class 11:	
Geo. L. Neville	237.45
The New Jersey Car Spring and Rubber Co	297.00
J. B. Kendall	317.64
Harry L. Briggs	238.65
Cuyler & Mohler	255.60
Loeb Bros.*	211.45
Page Belting Co	212.40
Class 12:	
The New Jersey Car Spring and Rubber Co	65.63
W. T. & F. B. Weaver	35.00

* Accepted.

† Decided by lot.

Proposals for supplies for the navy-yard, Washington, D. C.—Continued.

Class 12—Continued.	
Harry L. Briggs *	$14.88
McFadden Co	31.87
Page Belting Co	19.50
Class 13:	
Geo. L. Neville	360.00
Thompson C. Gill & Co	254.70
Geo. Ryneal, jr	243.00
W. T. & F. B. Weaver	300.00
J. B. Kendall	250.00
The Manhattan Supply Co	252.00
Shoemaker & Busch	239.70
Harry L. Briggs	258.75
Cuyler & Mohler	240.00
McFadden Co. *	231.00
Frank Clonds	238.50
Fiske Brothers	238.50
Class 14:	
The Carnegie Steel Co	607.11
J. B. Kendall *	555.07
Class 14—Continued.	
The Midvale Steel Co	$1,177.05
Class 15:	
F. P. May & Co. *	1,034.85
The J. Barton Smith Co	1,051.80
Harry L. Briggs	1,075.21
McFadden Co	1,078.44
Frank Clonds	1,176.55
Eugene L. Maxwell	1,054.66
Class 16:	
S. W. Niemeyer	60.00
J. B. Kendall *	34.50
Class 17:	
George L. Neville	750.00
Thompson C. Gill & Co	387.00
S. W. Niemeyer	445.00
L. Ledman	175.00
J. B. Kendall *	275.00
The Manhattan Supply Co	300.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated September 1, 1893; opened September 26, 1893.

Class 1:	
J. C. Wilson & Co	$947.50
Husband & Brooks *	850.00
Class 2:	
J. C. Wilson & Co. *	359.70
Husband & Brooks	375.00
Class 3:	
J. C. Wilson & Co.:	
Bid A	1,751.90
Bid B	2,039.40
Husband & Brooks *	1,305.00
Thompson C. Gill & Co	2,638.80
Class 4:	
W. F. Whittier *	21.50
Chas. M. Yates	26.00
Chas. H. Pleasants	45.49
Miller Sloss & Scott	31.00
Class 5:	
Miller, Sloss & Scott *	182.03
Dunham, Carrigan & Hayden Co	193.88
Class 6:	
A. S. Carman	1,683.88
Abraham Powell *	1,658.57
Class 7:	
Bradford, Kennedy Sons & McGuire *	31.20
Holbrook, Merrill & Stetson	34.32
S. C. Forsaith Machine Co	36.19
Charles H. Pleasants	68.64
Miller, Sloss & Scott	45.24
Dunham, Carrigan & Hayden Co	34.94
Phelps & Arnold	33.70
Thompson C. Gill & Co	37.44
Class 8:	
W. F. Whittier *	72.90
Chas. M. Yates	77.62
Chas. M. Childs & Co	104.62
Class 9:	
W. F. Whittier *	64.94
Chas. M. Yates	65.44
Class 9—Continued.	
Chas. H. Pleasants	$72.84
Chas. M. Childs & Co	72.27
Class 10:	
S. C. Forsaith Machine Co	327.77
Miller, Sloss & Scott	326.10
Dunham, Carrigan & Hayden Co. *	271.47
Class 11:	
R. J. R. Aden	391.50
A. S. Carman	414.00
Abraham Powell *	376.74
Class 13:	
R. J. R. Aden	184.25
A. S. Carmen	176.68
Abraham Powell	179.56
Class 14:	
The Pacific Rolling Mill Co	109.65
Miller, Sloss & Scott	114.15
Dunham, Carrigan & Hayden Co	135.74
Phelps & Arnold *	98.34
Class 15:	
W. F. Whittier	337.65
Chas. M. Yates	368.97
Chas. H. Pleasants	505.95
Phelps & Arnold *	331.10
N. & G. Taylor Co	409.76
Class 16. †	
Class 17:	
The Pacific Rolling Mill Co	1,675.97
S. C. Forsaith Machine Co	1,872.86
Carnegie Steel Co	1,469.43
Miller, Sloss & Scott	1,736.04
Dunham, Carrigan & Hayden Co. *	1,129.15
Phelps & Arnold	1,655.68
Class 18:	
Bradford, Kennedy Sons & McGuire *	995.94
Holbrook, Merrill & Stetson	1,005.75
S. C. Forsaith Machine Co	1,251.42
Millor Sloss & Scott	1,027.42
Dunham, Carrigan & Hayden Co	1,037.64
Phelps & Arnold	1,067.90
Thompson C. Gill & Co	1,152.14

Proposals for supplies for the navy-yard, League Island, Pa., under Bureau advertisement dated September 15, 1893; opened October 3, 1893.

Class 1:	
Brown & Sharpe Manufacturing Co.	$775.00
Joseph R. Beatty *	774.00
Class 2:	
The Thomberg Stone Quarrying and Crushing Co. *	2,942.94
The Glen Mills Stone Quarrying and Crushing Co	4,097.02
Class 2—Continued.	
Chas. G. Smith & Son	$3,439.17
The Brandywine Granite Co	3,153.15
Edwin A. Gaskill	4,129.12
Geo. L. Neville	5,698.50

* Accepted.

† Open purchase.

s for coal for the naval station, Key West, Fla., under Bureau advertisement dated September 22, 1893; opened October 10, 1893.

l G French	$5,960.00
f. Hamilton & Co	5,840.00
Duncan & Son	5,870.00
Peacock & Kerr *	5,575.00
d B. Townsend	5,660.00

s for stationery for the navy yard, Portsmouth, N. H., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Envelopes:	
Fletcher	$214.00
ttan Supply Co. *	161.45
Paper.	
Fletcher	268.80
ttan Supply Co. *	227.00
Irish linen paper and envel-	
Fletcher	166.85
ttan Supply Co*	84.02
Typewriter materials:	
ttan Supply Co. *	45.61
Blank books:	
Fletcher	245.95
ttan Supply Co. *	202.98
Rubber erasers, pencils, pen-	
Fletcher	113.77
ttan Supply Co	116.90
& Bilisoly *	104.78
nks and mucilage:	
Fletcher	86.60
ttan Supply Co. *	80.77
Class 8.—Pens:	
D. B. Fletcher	$67.45
Manhattan Supply Co	56.07
Hume & Bilisoly *	50.65
Class 9.—Rubber bands:	
Manhattan Supply Co. *	53.00
Hume & Bilisoly	67.61
Class 10.—Paper fasteners:	
D. B. Fletcher	95.00
Manhattan Supply Co	80.40
Hume & Bilisoly *	54.41
Class 11.—Metal articles:	
D. B. Fletcher	95.85
Manhattan Supply Co. *	82.81
Hume & Bilisoly	95.81
Class 12.—Miscellaneous:	
D. B. Fletcher	222.98
Manhattan Supply Co. *	183.12
Class 13.—Drawing materials:	
Manhattan Supply Co. *	63.53
Frost & Adams	77.82

s for stationery for the navy-yard, Boston, Mass., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Fletcher	$176.88
ttan Supply Co	169.45
l Ward Co. *	119.82
Fletcher	292.53
ttan Supply Co. *	224.58
l Ward Co	244.71
Fletcher	106.40
ttan Supply Co. *	46.95
l Ward Co	108.97
ttan Supply Co. *	34.54
l Ward Co	45.84
Fletcher	144.20
ttan Supply Co. *	103.95
l Ward Co	121.01
Fletcher	78.23
ttan Supply Co	64.42
& Bilisoly *	60.17
l Ward Co	70.99
Fletcher	64.80
ttan Supply Co	58.64
l Ward Co. *	55.99
Class 8:	
D. B. Fletcher	$50.85
Manhattan Supply Co	46.55
Hume & Bilisoly *	42.76
Samuel Ward Co	48.45
Class 9:	
Manhattan Supply Co	16.20
Hume & Bilisoly	23.71
Samuel Ward Co. *	12.55
Class 10:	
D. B. Fletcher	41.60
Manhattan Supply Co	34.15
Hume & Bilisoly *	28.70
Samuel Ward Co	33.90
Class 11:	
D. B. Fletcher	109.88
Manhattan Supply Co	96.21
Hume & Bilisoly	144.46
Samuel Ward Co. *	91.80
Class 12:	
D. B Fletcher	222.05
Manhattan Supply Co	174.90
Samuel Ward Co. *	169.08
Class 13:	
Manhattan Supply Co. *	33.05
Frost & Adams	33.33

s for stationery for the naval torpedo station, Newport, R. I., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Fletcher	$54.25
ttan Supply Co. *	51.10
Fletcher	35.30
ttan Supply Co. *	31.60
Fletcher	42.00
ttan Supply Co. *	20.30
ttan Supply Co. *	45.14
Fletcher	65.90
ttan Supply Co. *	49.32
Class 6:	
D. B. Fletcher	$23.55
Manhattan Supply Co	20.93
Hume & Bilisoly *	16.83
Class 7.	
D. B. Fletcher	25.90
Manhattan Supply Co. *	21.10
Class 8:	
D. B. Fletcher	10.35
Manhattan Supply Co	9.50
Hume & Bilisoly *	8.59
Class 9.	
Manhattan Supply Co. *	8.27
Hume & Bilisoly	12.15

* Accepted.

Proposals for stationery for the naval torpedo station, Newport, R. I., etc.—Continued.

Class 10:	
D. B. Fletcher	$12.00
Manhattan Supply Co	9.67
Hume & Bilisoly*	9.33
Class 11:	
D. B. Fletcher	28.81
Manhattan Supply Co	27.13
Hume and Bilisoly*	24.92
Class 12:	
D. B. Fletcher	$80.20
Manhattan Supply Co.*	62.25
Class 13:	
Manhattan Supply Co	47.85
Frost & Adams*	46.42

Proposals for stationery for the training station, Newport, R. I., under Bureau advertisement dated September 6, 1893; opened October 10, 1893.

Class 1:	
D. B. Fletcher	$73.40
Manhattan Supply Co.*	55.76
ass 2:	
D. B. Fletcher	180.80
Manhattan Supply Co.*	154.02
Class 3:	
D. B Fletcher	15.65
Manhattan Supply Co.*	8.15
Class 4:	
D. B. Fletcher	72.90
Manhattan Supply Co.*	68.94
Class 5:	
D. B. Fletcher	37.30
Manhattan Supply Co.*	29.76
Hume & Bilisoly	30.23
Class 6:	
D. B. Fletcher	39.75
Manhattan Supply Co.*	37.87
Class 7:	
D. B. Fletcher	13.40
Class 7—Continued:	
Manhattan Supply Co	$11.85
Hume & Bilisoly*	11.19
Class 8:	
Manhattan Supply Co.*	13.40
Hume & Bilisoly	20.40
Class 9:	
D. B. Fletcher	21.50
Manhattan Supply Co	22.37
Hume & Bilisoly*	18.96
Class 10:	
D. B. Fletcher	19.22
Manhattan Supply Co.*	13.80
Hume & Bilisoly	19.11
Class 11:	
D. B. Fletcher	43.40
Manhattan Supply Co.*	26.54
Class 12:	
Manhattan Supply Co	15.40
Frost & Adams*	11.58
Hume & Bilisoly	13.50

Proposals for stationery for the Naval War College, Newport, R. I., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
D. B. Fletcher	$299.84
Manhattan Supply Co.*	262.10

Proposals for stationery for naval station, New London, Conn., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
D. B. Fletcher	$82.36
Manhattan Supply Co.*	84.26

Proposals for stationery for navy-yard, New York, under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
W. Reed Gould*	$896.27
Manhattan Supply Co	922.08
Class 2:	
W. Reed Gould	3,367.66
Manhattan Supply Co	3,229.96
Arthur, Mountain & Co.*	3,137.28
Class 3:	
W. Reed Gould	174.50
Manhattan Supply Co.*	166.20
Class 4:	
W. Reed Gould	1,312.40
Manhattan Supply Co.*	1,136.90
Class 5:	
W. Reed Gould	2,111.39
Manhattan Supply Co.*	2,011.57
Class 6:	
W. Reed Gould	1,497.40
Manhattan Supply Co.*	1,266.67
Hume & Bilisoly	1,375.49
Class 7:	
W. Reed Gould	969.11
Manhattan Supply Co.*	780.38
The Burrows Stationery Co	837.20
Class 8:	
W. Reed Gould	$317.62
Manhattan Supply Co	331.51
The Burrows Stationery Co.*	315.77
Hume & Bilisoly	325.85
Class 9:	
W. Reed Gould	476.50
Manhattan Supply Co*	315.29
The Burrows Stationery Co	410.71
Hume & Bilisoly	447.72
Class 10:	
W. Reed Gould*	220.32
Manhattan Supply Co	253.27
The Burrows Stationery Co	235.55
Hume & Bilisoly	228.35
Class 11:	
W. Reed Gould	1,600.87
Manhattan Supply Co.*	1,294.46
Hume & Bilisoly	1,394.30
Class 12:	
W. Reed Gould	2,511.30
Manhattan Supply Co.*	1,870.21
Class 13:	
Manhattan Supply Co.*	1,361.91
Frost & Adams	1,488.13

Proposals for stationery for navy-yard, League Island, Pennsylvania, under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co	$145.95
Wm. H. Hoskins*	131.15
Class 2:	
Manhattan Supply Co.*	$282.12
Wm. H. Hoskins	381.28

* Accepted.

als for stationery for the navy-yard, League Island, Pa., etc.—Continued.

tan Supply Co.*	$34.73
Hoskins	76.67
tan Supply Co.*	79.50
Hoskins	109.31
tan Supply Co.*	179.56
Hoskins	233.72
tan Supply Co	153.63
Hoskins	160.51
Bilisoly*	142.33
Laws	173.34
tan Supply Co	91.46
rows Stationery Co.*	80.93
Hoskins	103.75
tan Supply Co	43.10
rows Stationery Co	65.99
Hoskins	43.95
Bilisoly*	39.04
Class 9:	
Manhattan Supply Co	$61.45
The Burrows Stationery Co	60.76
Wm. H. Hoskins	99.31
Hume & Bilisoly	96.70
Weil & Laws	113.50
Class 10:	
Manhattan Supply Co	22.33
The Burrows Stationery Co.*	20.79
Wm. H. Hoskins	26.56
Hume & Bilisoly	21.08
Class 11:	
Manhattan Supply Co	84.38
Wm. H. Hoskins	89.41
Hume & Bilisoly*	78.36
Class 12:	
Manhattan Supply Co.*	224.74
Wm. H. Hoskins	290.29
Class 13:	
Manhattan Supply Co	245.86
Frost & Adams	296.68
Wm. H. Hoskins	285.50
Weil & Laws	226.60

for stationery for the Naval Academy, Annapolis, Md., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

tan Supply Co	$95.52
rows Stationery Co.*	85.42
tan Supply Co	425.51
rows Stationery Co.*	314.51
tan Supply Co	101.80
rows Stationery Co.*	59.95
tan Supply Co	48.53
rows Stationery Co.*	32.96
tan Supply Co	306.08
rows Stationery Co.*	209.21
tan Supply Co	153.80
rows Stationery Co.*	138.01
Bilisoly	145.96
tan Supply Co	91.13
rows Stationery Co.*	86.54
tan Supply Co	64.57
Class 8—Continued:	
Wm. Ballantyne & Sons*	$61.32
The Burrows Stationery Co	63.06
Hume and Bilisoly	64.35
Class 9:	
Manhattan Supply Co.*	88.70
William Ballantyne & Sons	100.39
The Burrows Stationery Co	91.74
Hume & Bilisoly	118.55
Class 10:†	
Manhattan Supply Co	94.57
William Ballantyne & Sons	95.41
The Burrows Stationery Co	93.08
Hume & Bilisoly	93.74
Class 11:	
Manhattan Supply Co	107.97
The Burrows Stationery Co.*	102.02
Hume & Bilisoly‡	113.79
Class 12:	
Manhattan Supply Co	230.87
The Burrows Stationery Co.*	216.33
Class 13:	
Manhattan Supply Co	221.90
The Burrows Stationery Co.*	178.01

for stationery for the navy-yard, Washington, D. C., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

tan Supply Co	$316.62
llantyne & Sons	341.94
rows Stationery Co.*	289.35
tan Supply Co	807.17
llantyne & Sons	908.71
rows Stationery Co.*	653.15
tan Supply Co.*	219.52
llantyne & Sons	403.36
rows Stationery Co	333.37
tan Supply Co.*	152.36
llantyne & Sons	180.79
rows Stationery Co	156.55
tan Supply Co	509.90
llantyne & Sons	636.72
rows Stationery Co.*	480.92
tan Supply Co	395.65
llantyne & Sons*	362.73
rows Stationery Co	390.56
Bilisoly	391.37
tan Supply Co	234.32
llantyne & Sons*	226.16
rows Stationery Co	234.49
tan Supply Co	175.94
Class 8—Continued:	
Wm. Ballantyne & Sons	$164.09
The Burrows Stationery Co.*	163.61
Hume & Bilisoly	166.02
Class 9:	
Manhattan Supply Co.*	128.05
Wm. Ballantyne & Sons	142.58
The Burrows Stationery Co	145.09
Hume & Bilisoly	174.35
Class 10:	
Manhattan Supply Co	158.57
Wm. Ballantyne & Sons*	144.13
The Burrows Stationery Co.*	161.46
Hume & Bilisoly	150.17
Class 11:	
Manhattan Supply Co	226.39
Wm. Ballantyne & Sons*	191.93
The Burrows Stationery Co	271.51
Hume & Bilisoly	275.33
Class 12:	
Manhattan Supply Co	358.54
The Burrows Stationery Co.*	317.31
Class 13:	
Manhattan Supply Co.*	1,426.62
Frost & Adams	1,672.86
Wm. Ballantyne & Sons	1,483.56
The Burrows Stationery Co	1,496.72
Geo. Ryneal, jr	1,445.89
Hume & Bilisoly	1,579.46
Fred. A. Schmidt	1,508.08

*Accepted. † No award; open purchase. ‡ Informal.

Proposals for stationery for the navy-yard, Norfolk, Va., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co	$198.77
The Burrows Stationery Co.*	165.37
Hume & Bilisoly	183.62
Class 2:	
Manhattan Supply Co	527.75
The Burrows Stationery Co.*	302.03
Hume & Bilisoly	434.58
Class 3:	
Manhattan Supply Co.*	108.72
Wm. Ballantyne & Sons	218.59
The Burrows Stationery Co	185.37
Hume & Bilisoly	188.05
Class 4:	
Old Dominion Paper Co	204.21
Manhattan Supply Co.*	176.53
Wm. Ballantyne & Sons	234.17
The Burrows Stationery Co	190.91
Hume & Bilisoly	223.56
Class 5:	
Manhattan Supply Co	300.44
The Burrows Stationery Co	300.40
Hume & Bilisoly*	266.47
Class 6:	
Manhattan Supply Co.*	211.86
The Burrows Stationery Co	229.32
Hume & Bilisoly	229.84
Class 7:	
Old Dominion Paper Co	111.47
Manhattan Supply Co	111.42
The Burrows Stationery Co	105.52
Hume & Bilisoly*	94.52
Class 8:	
Old Dominion Paper Co	97.72
Manhattan Supply Co	96.34
The Burrows Stationery Co.*	91.09
Hume & Bilisoly	94.86
Class 9:	
Old Dominion Paper Co.*	89.30
Manhattan Supply Co	91.75
Wm. Ballantyne & Sons	104.53
The Burrows Stationery Co	101.61
Hume & Bilisoly	120.89
Class 10:	
Old Dominion Paper Co	95.17
Manhattan Supply Co	98.79
Wm. Ballantyne & Sons	94.48
The Burrows Stationery Co	93.15
Hume & Bilisoly*	91.91
Class 11:	
Manhattan Supply Co.*	138.87
The Burrows Stationery Co	156.97
Hume & Bilisoly	146.28
Class 12:	
Manhattan Supply Co	237.35
The Burrows Stationery Co	233.14
Hume & Bilisoly*	231.00
Class 13:	
Manhattan Supply Co	482.60
Frost & Adams	557.85
The Burroughs Stationery Co	538.83
Hume & Bilisoly*	461.71

Proposals for stationery for naval station, Key West, Fla., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co.*	$90.63

Proposals for stationery for navy-yard, Pensacola, Fla., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co.*	$204.85

Proposals for stationery for navy-yard, Mare Island, Cal., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Cunningham, Curtis & Welch	$386.10
Dutton & Partridge	391.47
J. P. Lecount	434.60
Payot, Upham & Co.*	383.32
H. S. Crocker Co	894.85
Manhattan Supply Co	410.75
Class 2:	
Cunningham, Curtis & Welch	1,111.45
Dutton & Partridge	1,121.65
J. P. Lecount	1,168.20
Payot, Upham & Co.*	1,110.85
H. S. Crocker Co	1,130.13
Manhattan Supply Co	1,149.95
Class 3:	
Cunningham, Curtis & Welch*	511.63
Dutton & Partridge	516.25
J. P. Lecount	528.50
Payot, Upham & Co	529.25
Manhattan Supply Co	548.20
Class 4:	
Cunningham, Curtis & Welch*	506.65
Dutton & Partridge	508.90
J. P. Lecount	542.85
Payot, Upham & Co	522.95
Manhattan Supply Co	544.60
Class 5:	
Cunningham, Curtis & Welch	577.20
Dutton & Partridge	571.68
J. P. Lecount*	570.38
Payot, Upham & Co	590.63
H. S. Crocker Co	585.60
Manhattan Supply Co	624.60
Class 6:	
Cunningham, Curtis & Welch	$291.09
Dutton & Partridge*	277.26
J. P. Lecount	292.48
Payot, Upham & Co	292.85
H. S. Crocker	282.87
Manhattan Supply Co	311.66
Class 7:	
Cunningham, Curtis & Welch	202.80
Dutton & Partridge	195.00
J. P. Lecount	193.35
Payot, Upham & Co	213.60
H. S. Crocker Co.*	192.50
Manhattan Supply Co	217.70
Class 8:	
Cunningham, Curtis & Welch	108.25
Dutton & Partridge*	103.39
J. P. Lecount	105.90
Payot, Upham & Co	109.90
H. S. Crocker Co	106.00
Manhattan Supply Co	111.64
Class 9	
Cunningham, Curtis & Welch	68.60
Dutton & Partridge*	67.96
J. P. Lecount	73.50
Payot, Upham & Co	74.85
H. S. Crocker Co	68.65
Manhattan Supply Co	74.25
Class 10:	
Cunningham, Curtis & Welch	51.30
Dutton & Partridge*	48.82
J. P Lecount	54.93
Payot, Upham & Co	50.13
H. S. Crocker & Co	51.20
Manhattan Supply Co	52.65

*Accepted.

Proposals for stationery for navy-yard, Mare Island, Cal., etc.—Continued.

Class 11:	
Cunningham, Curtis & Welch	$423.50
Dutton & Partridge	408.28
J. P. Lecount*	390.20
Payot, Upham & Co	406.78
H. S. Crocker Co	430.65
Manhattan Supply Co	441.40
Class 12:	
Cunningham, Curtis & Welch*	1,078.85
Dutton & Partridge	1,082.35
J. P. Lecount	1,138.29
Class 12—Continued.	
Payot, Upham & Co	$1,102.47
H. S. Crocker Co	1,090.64
Manhattan Supply Co	1,185.90
Class 13:	
Cunningham, Curtis & Welch	521.80
Dutton & Partridge	514.62
J. P. Lecount	582.77
Payot, Upham & Co	558.26
H. S. Crocker Co.*	513.20
Manhattan Supply Co	584.15

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated September 30, 1893; opened October 17, 1893.

Class 1:	
Henry C. Broking	$5,109.00
Walter H. McDaniels*	4,382.00
J. B. Monell & Co	5,214.00
Class 2:	
Manhattan Supply Co	421.13
R. M. Gilmore Manufacturing Co.*	401.28
S. C. Forsaith Machine Co	629.37
Class 3:	
Morse Burtis	236.80
Manhattan Supply Co	248.00
S. C. Forsaith Machine Co.*	218.00
Chas. H. Pleasants	387.80
Thompson C. Gill & Co	245.00
Class 4:	
Fiske Bros	348.00
Manhattan Supply Co	582.00
Gutta Percha and Rubber Manufacturing Co	630.00
Aquila Reich	834.00
N. J. Car Spring and Rubber Co	870.00
Page Belting Co.*	282.00
Class 5:	
Donegan & Swift	960.43
Morse Burtis	1,009.36
Colwell Lead Co	905.50
Manhattan Supply Co	1,069.85
E. T. Tweedy*	903.94
Henry McShane Manufacturing Co.	1,014.72
S. C. Forsaith Machine Co	1,315.79
Class 6:	
George F. Bishop*	140.09
Class 7: †	
Donegan & Swift	2,774.60
Morse Burtis	2,724.00
Kennedy Valve Manufacturing Co.	2,710.00
Manhattan Supply Co	2,859.00
Class 8:	
Class 9:	
Fiske Bros	$1,980.00
Western Electric Co.*	210.00
International Trading and Electric Co	222.00
Manhattan Supply Co	221.64
Ira B. White	252.00
S. C. Forsaith Machine Co.:	
Bid A	1,548.00
Bid B	888.00
Chas. H. Pleasants	275.88
Class 10:	
Western Electric Co	1,590.00
Ira B. White*	1,172.00
Thompson C. Gill & Co	1,284.50
Class 11:	
Manhattan Supply Co	40.00
Shoemaker & Busch*	28.55
Charles H. Pleasants	30.44
Thompson C. Gill & Co	142.00
Class 12:	
International Trading and Electric Co	837.50
Porter's Sons & Co	745.00
Wm. Porters Sons*	531.75
Ira B. White	1,045.00
Joseph Barré	536.50
Class 13.	
Manhattan Supply Co.*	959.08
Ira B. White	971.50
Class 14:	
Manhattan Supply Co	262.70
Porters Son & Co	69.09
Wm. Porters Sons	70.70
Joseph Barré*	61.00
Class 15:	
Manhattan Supply Co	56.40
Chas. H. Pleasants	26.70

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated September 29, 1893; opened October 17, 1893.

Class 1:	
Bement, Miles & Co.*	$8,922.00
Niles Tool Works Co	11,370.00
Class 2:	
Manhattan Supply Co	250.22
McFadden Co.*	192.34
Ira B. White	284.15
Harry L. Briggs	201.02
Eugene L. Maxwell	220.31
S. C. Forsaith Machine Co	259.07
Class 3:	
Manhattan Supply Co.*	29.05
McFadden Co	35.33
Ira B. White	58.00
Class 4:	
Manhattan Supply Co	74.87
Boston Woven Hose and Rubber Co.	89.00
McFadden Co	152.35
Fiske Bros	109.75
Harry L. Briggs*	63.25
New Jersey Car Spring and Rubber Co	74.35
Thompson C. Gill & Co	102.50
Class 5:	
Donegan & Swift	172.17
Tyler & Mohler	172.96
Class 5—Continued.	
Manhattan Supply Co	$173.55
Robt. Leitch & Sons	176.25
McFadden Co	157.52
S. C. Forsaith Machine Co	164.30
E. T. Tweedy	154.62
A. P. Swoyer*	147.34
Class 6:	
George L. Neville	2,804.22
Church & Stevenson	2,195.85
John Hoffman	2,245.08
Edwin A. Gaskill	2,215.26
J. B. Kendall	2,280.30
D. C. Alexander	3,380.00
Joseph W. Duryee	2,708.88
W. T. & T. B. Weaver*	1,764.00
Thos. W. Smith	1,998.36
Class 7:	
Manhattan Supply Co.*	5,069.70
Class 8:	
Aquila Rich*	27.50
Class 9:	
Charles M. Childs & Co	110.52
Robert J. Kelly	127.00
Shoemaker & Busch	115.51
Smith, Kline & French Co	107.64

* Accepted. † No award. ‡ Open purchase.

Proposals for supplies for the navy-yard, Washington, D. C., etc.—Continued.

Class 9—Continued.	
The Phœnix Paint Co	$119.50
W. T. & F. B. Weaver	134.45
Wm. W. Lawrence	109.75
Ira B. White	107.25
George Ryneal, jr	122.57
E. T. Tweedy	117.06
Class 10:	
George L. Neville	140.00
Chas. M. Childs & Co	115.60
Robert J. Kelly	117.00
Shoemaker & Busch	124.80
Wetherill & Bro	117.00
Smith, Kline & French Co	116.00
The Phœnix Paint Co	118.00
W. T. & F. B. Weaver	130.00
Class 10—Continued.	
Wm. W. Lawrence*	$114.00
Ira B. White	114.60
Geo. Ryneal, jr	128.00
Aquila Rich	128.80
Thompson C. Gill & Co	155.00
Class 11:	
George L. Neville	675.00
J. B. Kendall*	522.00
Manhattan Supply Co	950.00
McFadden Co	610.90
Ira B. White	671.00
Harry L. Briggs	820.00
J. H. Sternbergh	700.00
Thompson C. Gill & Co	820.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated September 19, 1893; opened October 17, 1893.

Class 1:	
Allison Manufacturing Co.*	$4,826.25
Miller, Sloss & Scott	4,884.00
Charles Miller	6,831.00
Morris Tasker & Co	5,610.00
S. C. Forsaith Machine Co	7,095.00
Dunham, Carrigan & Hayden Co	4,983.00
Class 2:	
Miller, Sloss & Scott	587.50
Chas. Miller	590.20
Cosby Steam Gauge and Valve Co.*	503.40
S. C. Forsaith Machine Co	635.21
Dunham, Carrigan & Hayden Co	540.75
Class 3:	
Miller, Sloss & Scott	146.00
Class 3—Continued.	
Chas. Miller	$65.40
S. C. Forsaith Machine Co.*	62.60
Dunham, Carrigan & Hayden Co	97.50
Class 4:	
Miller, Sloss & Scott	157.00
Chas. Miller*	83.50
Cosby Steam Gauge and Valve Co	208.00
S. C. Forsaith Machine Co	92.70
Dunham, Carrigan & Hayden Co	95.00
Class 5:	
Miller, Sloss & Scott	52.00
Chas. Miller*	34.00
Dunham, Carrigan & Hayden Co	41.50

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated September 28, 1893; opened October 17, 1893.

Class 1:	
Geo. L. Neville	$168.65
Harry L. Briggs	198.01
Manhattan Supply Co	213.93
McFadden Co.*	131.18
Ira B. White	157.37
Class 2:	
Geo. L. Neville*	437.81
Harry L. Briggs	472.34
J. B. Kendall	703.85
Manhattan Supply Co	478.70
McFadden Co	552.49
Ira B. White	609.20
Class 3:	
Geo. L. Neville	913.75
Henry C. Broking	868.87
W. D. Clark & Co	960.50
J. B. Morrell & Co.*	843.41
Class 4:	
Geo. L. Neville	201.00
Henry C. Broking*	193.50
Manhattan Supply Co	213.00
J. B. Morrell & Co	204.00
Class 5:	
Geo. L. Neville	456.50
Henry C. Broking	434.50
W. D. Clark & Co	462.00
J. B. Morrell & Co.*	423.50
Class 6.	
Geo. L. Neville	147.50
S. W. Niemeyer	145.00
Manhattan Supply Co.*	132.50
Ira B. White	230.00
Class 7:	
Geo. L. Neville	83.75
A. P. Swoyer & Co	111.71
Manhattan Supply Co	55.60
McFadden Co	60.47
John Lucas & Co.*	53.10
Class 8:	
Geo. L. Neville	909.50
Harry L. Briggs*	855.58
[illegible]dford, Kennedy Sons & McGuire	861.68
[illegible]hattan Supply Co	953.31
Class 8—Continued.	
McFadden Co	$890.05
Ira B. White	943.42
J. H. Chesley & Co	971.48
Class 9:	
George L. Neville	71.30
Wm. Porter's Sons	52.74
Manhattan Supply Co	43.68
McFadden Co.*	40.12
Ira B. White	44.30
Class 10:	
Geo. L. Neville	730.75
Harry L. Briggs	690.96
Page Belting Co	722.30
Heine Belting Co.*	616.00
E. V. White & Co	871.50
Manhattan Supply Co	736.00
McFadden Co	727.14
Class 11:	
Edwin A. Gaskill	1,470.00
Duke & Smith*	819.40
Chas. S. Connor	1,280.00
Class 12:	
Geo. L. Neville	237.05
Harry L. Briggs*	165.92
Manhattan Supply Co	190.90
McFadden Co	174.91
Ira B. White	182.82
J. H. Chesley & Co	192.75
Class 13:	
Geo. L. Neville	544.06
J. B. Kendall	316.05
A. P. Swoyer & Co	301.27
McFadden Co.*	281.85
Parke Bro. & Co.:	
Bid A	442.81
Bid B	496.81
Ira B. White	321.80
Class 14:	
Geo. L. Neville	441.00
J. B. Kendall	696.55
A. P. Swoyer & Co.*	388.00
Manhattan Supply Co	470.20
Ira B. White	365.55

* Accepted.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

Neville*	$821.15
L. Briggs	869.68
n & Swift	934.90
ndall	883.58
d. Kennedy Sons & McGuire	863.45
ttan Supply Co	893.85
den Co	913.31
White	910.35
nesley & Co	903.50
. Kelly	2,029.54
l. Childs & Co	1,469.23
Kline & French Co	1,491.42
White*	1,410.28
ker & Busch	1,541.93
H. Pleasants	1,684.00
Rich	1,583.97
c Paint Co	1,725.68
Neville	660.00
. Kelly	378.13
l. Childs & Co	346.50
Kline & French Co	371.25
White	405.62
. Lawrence	468.00
cas & Co	357.50
l. Pleasants	521.95
Rich*	329.45
L. Neville	940.00
. Kelly	722.50
l. Childs & Co	753.00
Kline & French Co	756.50
White*	744.90
ill & Bro	770.20
ker & Bush	813.70
. Lawrence	750.00
ucas & Co	780.00
l. Pleasants	843.70
Rich	824.20
c Paint Co	865.00
L. Neville*	228.00
. Kelly	276.75
l. Childs & Co	231.00
Kline & French Co	234.00
hite & Co	261.00
White	246.00
. Lawrence	235.50
ucas & Co	240.00
l. Pleasants	250.50
c Paint Co	283.50
Neville	291.00
J. Kelly	321.00
l. Childs & Co	274.50
Kline & French Co	276.00
White	290.00
. Lawrence*	269.00
cas & Co	290.00
l. Pleasants	311.00
c Paint Co	297.00
L. Neville*	426.00
Bros	438.00
Kline & French Co	486.00
White	434.70
Neville	90.00
. Kelly	139.20
n Oil Co	123.00
d Oil Co.*	87.00
Bros	96.00
Neville	151.80
iemeyer*	124.50
White	456.00
ker & Busch	177.75
l. Pleasants	310.41
Rich	519.00
Kline & French Co	233.00
ker & Busch*	228.50
Rich	250.00

Class 25:	
George L. Neville	$189.60
Manhattan Supply Co	177.45
McFadden Co.*	142.57
Ira B. White	185.10
Shoemaker & Busch	153.78
Chas. H. Pleasants	162.86
Class 26:	
Geo. L. Neville	311.96
Harry L. Briggs*	183.81
Bradford, Kennedy Sons & McGuire	185.86
Manhattan Supply Co	208.21
Ira B. White	204.97
J. H. Chesley & Co	188.15
Class 27:	
Geo. L. Neville	552.00
Harry L. Briggs	442.30
Robt. J. Kelly	402.10
Chas. M. Childs & Co	436.75
Smith, Kline & French Co	458.15
Ira B. White	448.50
Shoemaker & Busch	402.20
Wm. W. Lawrence,	457.00
Jno. Lucas & Co	548.90
Chas. H. Pleasants	500.00
Aquila Rich*	397.72
Phœnix Paint Co.†	119.25
Class 28:	
George L. Neville	238.25
Manhattan Supply Co.*	153.50
Ira B. White	188.00
Class 29:	
George L. Neville	185.04
Harry L. Briggs*	140.71
Manhattan Supply Co	228.58
McFadden Co	168.35
Ira B. White	151.71
J. H. Chesley & Co	162.69
Class 30:	
Geo. L. Neville	740.00
Edwin A Gaskill	640.00
Chas. S. Connor*	630.00
Class 31:	
George L. Neville	1,711.00
Edwin A. Gaskill*	1,475.00
S. C. Forsaith Machine Co	1,638.00
Chas. S. Connor	1,780.00
Class 32:	
George L. Neville	1,802.00
Edwin A. Gaskill	2,400.00
Chas. S. Connor*	1,747.00
Class 33:	
George L. Neville	1,403.60
Edwin A Gaskill*	1,373.00
Chas. S. Connor	1,721.80
Class 34:	
Geo. L. Neville	300.00
Edwin A. Gaskill*	210.00
Chas. S. Connor	247.50
Class 35:	
George L. Neville	367.50
Harry L. Briggs	236.60
Boston Woven Hose and Rubber Co.	224.50
Fiske Bros	300.55
E. V. White & Co	241.00
Manhattan Supply Co.*	214.20
McFadden Co	281.24
Ira B. White	252.50
Class 36:	
Geo. L. Neville*	584.81
Donegan & Swift	620.61
Cuyler & Mohler	683.41
S. C. Forsaith Machine Co	595.36
E. T. Tweedy	602.93
A. P. Swoyer & Co	587.15
E. V. White & Co	668.33
Manhattan Supply Co	614.31
McFadden Co	594.58
Class 37:	
George L. Neville	264.00
Donegan & Swift	251.00
Cuyler & Mohler	244.00
Morse Burtis	230.00
A. P. Swoyer & Co.* ‡	230.00
E. V. White & Co	257.00
Manhattan Supply Co	244.00

* Accepted. † Withdrawn. ‡ Tie bid.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

Class 38:	
George L. Neville	$400.00
Harry L. Briggs	387.50
Manhattan Supply Co	415.50
Ira B. White*	374.00
Chas. H. Pleasants	399.49
Class 39:	
George L. Neville	$368.15
Harry L. Briggs*	293.92
Manhattan Supply Co	321.13
McFadden Co	296.62
Ira B. White	317.06

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated September 27, 1893; opened October 24, 1893.

Class 1:	
Thompson C. Gill & Co	$176.00
Dunham, Carrigan & Hayden Co.*	108.00
Class 2:	
Miller, Sloss & Scott	655.00
Dunham, Carrigan & Hayden Co	648.90
Manhattan Supply Co.*	509.00
Class 3:	
Miller, Sloss & Scott	172.50
Dunham, Carrigan & Hayden Co.*	116.00
J. N. Knowles	140.00
Louis E. Lake	153.00
Fiske Bros*	130.00
Class 4:	
S. C. Forsaith Machine Co	$883.98
Miller, Sloss & Scott	1 163.30
Dunham, Carrigan & Hayden Co.*	777 05
Class 5:	
Vacuum Oil Co	1,500.00
Standard Oil Co	2,487.50
F. N Woods	3,475.00
Sanford Taylor	2,450.00
J. N. Knowles	5,000.00
American Oil Co	2,650.00
Fiske Bros.*	1,262.50

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated October 4, 1893; opened October 24, 1893.

Class 1:	
J. B. Morrell & Co	$688.50
Harry L. Briggs	718.17
John J. Wheeler	930.03
Clifford Pemberton	689.82
Manhattan Supply Co.*	655.75
Class 2:	
J. B. Morrell & Co.*	4,026.00
G. K. Sheridan & Co	357.00
Henry C. Broking	4,043.50
Class 3:	
Harry L. Briggs	147.94
Bradford, Kennedy Sons & McGuire	123.80
Shoemaker & Busch*	116.90
Manhattan Supply Co	135.10
Class 4:	
Abraham F. Underwood	587.19
Harry L. Briggs	585.85
S. C. Forsaith Machine Co	686.75
Bradford, Kennedy Sons & McGuire	541.90
Manhattan Supply Co.*	524.59
Class 5:	
Heim Belting Co.*	199.00
Page Belting Co*	232.75
Manhattan Supply Co	211.00
Loeb Bros	219.00
Class 6:	
Watson & Pittinger*	573.30
Charles E. Pell	612.70
Wm. R. Adams	656.00
C. F. Hodsdon	641.00
Joseph W. Duryee	631.80
Class 7:	
Watson & Pittinger	2,175.00
Chas. E. Bell*	2,105.25
Wm. R. Adams	2,550.00
S. C. Forsaith Machine Co	3,087.50
C. F. Hodsdon	2,347.50
Joseph W. Duryee	2,460.00
Class 8:	
Watson & Pittinger	288.00
Chas. E. Pell	516.00
Wm. R. Adams	300.00
C. F. Hodsdon	360.00
Joseph W. Duryee*	274.80
Class 9:	
Ajax Metal Co	(†)
Eugene L. Maxwell	278.70
Bridgeport Deoxidized Bronze and Metal Co	(†)
Manhattan Supply Co.*	261.00
Class 10:	
Chas. M. Childs & Co	1,726.00
Phœnix Paint Co.*	1,296.00
J. B. Morrell & Co	1,947.50
Aquila Rich	1,481.00
Harry L. Briggs	1,671.50
Class 10—Continued.	
Fiske Bros	$1,642.50
Clifford Pemberton	1,612.00
Shoemaker & Busch	1,483.00
Smith, Kline & French Co	1,700.50
Class 11:	
Chas. M. Childs & Co.*	1,335.65
Aquila Rich	1,408.41
Fiske Bros	1,387.80
Clifford Pemberton	1,373.80
Shoemaker & Busch	1,840.62
Smith, Kline & French Co	1,434.80
Class 12:	
Aquila Rich	1,497.00
Smith, Kline & French Co.*	1,334.00
Class 13:	
Manhattan Oil Co	5,010.00
Fiske Bros.*	4,708.50
Class 14:	
Chas. M. Childs & Co	1,862.50
Phœnix Paint Co	1,880.00
J. B. Morrell & Co	2,000.00
Aquila Rich	2,020.00
S. C. Forsaith Machine Co	1,880.00
Manhattan Oil Co	2,010.00
Fiske Bros	1,919.00
Smith, Kline & French Co.*	1,740.00
Class 15:	
J. B. Morrell & Co	59.00
Aquila Rich	65.00
Manhattan Oil Co	57.75
Fiske Bros.*	48.50
Class 16:	
Chas. M. Childs & Co	2,320.00
J. B. Morrell & Co	1,740.00
Aquila Rich	1,520.00
Fiske Bros.*	1,460.00
Smith, Kline & French Co	1,570.00
Class 17:	
Wm. W. Lawrence	2,950.00
Phœnix Paint Co	3,150.00
Aquila Rich	3,000.00
S. C Forsaith Machine Co	3,065.00
Wetherill & Bro	3,075.00
Clifford Pemberton*	2,739.90
Smith, Kline & French Co	2,800.00
Harry L. Briggs	2,740.00
Class 18:	
Chas. M. Childs & Co	1,480.00
Wm. W Lawrence	1,675.00
Aquila Rich	1,558.00
S. C. Forsaith Machine Co	1,478.00
Clifford Pemberton	1,587.96
Smith, Kline & French Co.*	1,200.00

* Accepted. Informal

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 19:	
Wm. W. Lawrence	$2,875.00
Phœnix Paint Co	3,000.00
S. C. Forsaith Machine Co	2,920.00
Wetherill & Bro	2,925.00
Clifford Pemberton*	2,619.70
Smith, Kline & French Co	2,800.00
Harry L. Briggs	2,745.00
Class 20:	
Abraham F. Underwood	655.40
Harry L. Briggs	557.60
Class 20—Continued.	
Bradford, Kennedy Sons & McGuire	$549.77
Manhattan Supply Co.*	547.75
Class 21:	
J. B. Morrell & Co	602.00
Harry L. Briggs	613.50
Fiske Bros.*	541.70
Bradford, Kennedy Sons & McGuire	577.50
Eugene L. Maxwell	549.25
Shoemaker & Busch	619.00
Manhattan Supply Co	581.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated October 3, 1893; opened October 31, 1893.

Class 1.—Brushes, etc.:	
Miller, Sloss & Scott	$312.55
Huntington-Hopkins Co	297.72
Dunham, Carrigan & Hayden Co	303.50
Wakefield Baker*	280.03
Class 2.—Leather:	
Miller, Sloss & Scott*	61.00
Chas. H. Pleasants	85.75
Class. 3.—Lumber:	
Wm. Walker*	1,337.62
Abraham Powell	1,635.00
Benton Holmes & Co	1,800.00
R. J. R. Aden	1,865.00
F. W. Kreling & Sons	1,414.50
Class 4.—Tool steel:	
Park, Brother & Co	230.00
Miller, Sloss & Scott	181.12
Huntington-Hopkins Co	86.75
Dunham, Carrigan & Hayden Co.*	86.13
Thompson C. Gill & Co	103.50
Class 5.—Mild steel:	
Miller, Sloss & Scott*	533.43
Dunham, Carrigan & Hayden Co	573.28
Class 6.—Brass:	
W. F. Garratt & Co	110.00
Miller, Sloss & Scott	98.75
Dunham, Carrigan & Hayden Co.*	89.95
Class 7.—Ingot copper:	
W. F. Garratt & Co.*	388.00
Miller, Sloss & Scott	476.25
Dunham, Carrigan & Hayden Co	401.50
Class 8.—Packing:	
Bowers Rubber Co	770.00
Class 8—Continued.	
Boston Woven Hose and Rubber Co.*	$527.50
Miller, Sloss & Scott	915.00
Arnett & Rivers	693.00
Fiske Bros	661.75
Class 9.—Alcohol:	
W. F. Whittier*	468.00
Class 10.—White lead:	
Chas. M. Childs & Co	375.00
W. F. Whittier*	266.50
Chas. M. Yates	281.25
Class 11.—Turpentine, etc.:	
Chas. M. Childs & Co	576.00
W. F. Whittier	499.50
Chas. M. Yates*	480.75
Chas. H. Pleasant	630.00
Class 12.—Pipe, etc.:	
Wm. Walker	1,047.27
Phelps & Arnold	1,067.54
W. F. Garratt & Co	1,046.59
Miller, Sloss & Scott	1,190.75
S. C. Forsaith Machine Co	1,034.71
Dunham, Carrigan & Hayden Co.*	993.12
Class 13.—Cotton waste:	
Miller, Sloss & Scott	179.80
Huntington-Hopkins Co	190.00
W. F. Whittier	178.00
Dunham, Carrigan & Hayden Co	179.80
Fiske Bros	175.00
Chas. H. Pleasants	199.80
Wakefield Baker*	165.00
Wadham's Oil and Grease Co	200.00
Thompson C. Gill & Co	220.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated October 10, 1894; opened November 7, 1893.

Class 1.—Nuts, rivets, etc.:	
Bradford, Kennedy Sons & McGuire*	$231.69
Miller, Sloss & Scott	491.85
Dunham, Carrigan & Hayden Co	284.97
Class 2.—Brooms and brushes:	
Miller, Sloss & Scott*	95.40
Louis E. Lake	99.75
Class 3.—Cement:	
Miller, Sloss & Scott*	76.00
Dunham, Carrigan & Hayden Co	79.00
Class 4.—Rope:	
Bradford, Kennedy Sons & McGuire*	139.00
Miller, Sloss & Scott	240.44
S. C. Forsaith Machine Co	176.14
Dunham, Carrigan & Hayden Co	170.44
Chas. H. Pleasants	217.63
Class 5.—Thread, etc.:	
Miller, Sloss & Scott*	15.50
Class 6.—Hardware:	
Miller, Sloss & Scott	930.56
Harry L. Briggs*	774.37
Dunham, Carrigan & Hayden Co	796.96
Class 7.—Leather, etc.:	
Miller, Sloss & Scott	477.60
Dunham, Carrigan & Hayden Co	415.97
Chas. C. Nichols*	407.86
Class 8.—Lumber:	
A. S. Carman	6,169.50
Class 8—Continued.	
F. W. Kreeling & Sons*	$5,505.00
William Walker	6,791.25
Abraham Powell	6,254.50
Class 9.—Tools:	
Miller, Sloss & Scott	242.50
Pacific Tool and Supply Co.*	205.53
Harry L. Briggs	219.12
S. C. Forsaith Machine Co	233.78
Dunham, Carrigan & Hayden Co	243.15
Class 10.—Metals:	
Bradford, Kennedy Sons & McGuire	1,576.12
Miller, Sloss & Scott	1,673.12
S. C. Forsaith Machine Co	1,750.45
Dunham, Carrigan & Hayden Co.*	1,504.98
Class 11.—Packing:	
Boston Woven Hose and Rubber Co.	237.00
Miller, Sloss & Scott	293.00
Dunham, Carrigan & Hayden Co.*	126.75
Class 12.—Paint:	
W. F. Whittier	550.85
Chas. M. Yates*	482.30
Chas. H. Pleasants	726.25
Class 13.—Pipe and fittings:	
Miller, Sloss & Scott	2,931.19
S. C. Forsaith Machine Co	2,734.01
Dunham, Carrigan & Hayden Co.*	2,719.07

* Accepted.

Proposals for supplies for the navy-yard, Mare Island, Cal., etc.—Continued.

Class 14.—Oars:	
S. C. Forsaith Machine Co	$208.20
A. S. Carman	240.60
Abraham Powell	237.40
Chas. H. Pleasants *	173.70
Class 15.—Tools:	
Miller, Sloss &, Scott	538.63
Pacific Tool and Supply Co.*	443.74
Harry L. Briggs	491.49
S C. Forsaith Machine Co	649.32
Class 15—Continued.	
Dunham, Carrigan & Hayden Co	$537.82
Class 16.—Candles, etc:	
Miller, Sloss & Scott	154.10
Louis E. Lake	148.45
Chas. H. Pleasants *	142.75
Class 17.—Blowers:	
S. C. Forsaith Machine Co	780.00
Buffalo Forge Co	700.00
F. F. Stuttevant Co.*	550.00

Proposals for supplies for the New York navy-yard under Bureau advertisement dated October 18, 1893; opened November 14, 1893.

Class 1.—Carpet:	
Abraham Abraham *	$857.50
W. & J Sloan †	840.00
Class 2.—Boiler tubes:	
A. P Swoyer	6,423.50
The Tyler Tube and Pipe Co	5,242.00
S. C. Forsaith Machine Co	8,029.50
Pancoast & Rogers *	5,054.00
Class 3.—Burden's iron:	
Hannibal Green's Son & Co	3,452.80
A. P. Swoyer ‡	2,323.14
The Manhattan Supply Co	3,736.00
Brown & Co	3,198.80
Frank H. Woodruff & Co	3,769.20
Class 4.—Steel:	
A. P. Swoyer *	106.03
The Benjamin Atha & Illingworth Co	123.14
The Manhattan Supply Co	149.33
Frank H. Woodruff & Co	109.26
Class 5.—Steel:	
A. P Swoyer	461.92
J. H. Sternbergh	449.85
The Benjamin Atha & Illingworth Co	391.59
Park Bro. & Co., Limited *	250.76
The Manhattan Supply Co	450.27
S. C. Forsaith Machine Co	486.61
Class 6.—Tools:	
Philadelphia Machinery and Supply Co	424.83
The Manhattan Supply Co	460.55
Harry L. Briggs *	411.14
Class 7.—Iron:	
A. P Swoyer *	299.79
The Manhattan Supply Co	437.32
Frank H. Woodruff & Co	364.52
S. C. Forsaith Machine Co	511.53
Class 8.—Hardware:	
Oliver Bros	785.84
The Manhattan Supply Co.*	620.96
Harry L. Briggs	627.06
S. C Forsaith Machine Co	806.94
Class 9.—Diving outfits:	
Andrew J. Morse	1,300.00
A. Schrader & Son *	1,280.00
Class 10.—Files:	
A. P. Swoyer	7.32
Oliver Bros	7.08
The Manhattan Supply Co	6.60
Harry L. Briggs	6.54
John H. Tissot, jr.*	6.48
Class 11.—Blocks:	
Ira B. White	586.90
A. P. Swoyer *	542.66
The Manhattan Supply Co	554.00
Harry L. Briggs	566.65
John H. Tissot, jr	565.32
Class 12.—Sheaves:	
Ira B. White	62.38
A. P. Swoyer	82.66
The Manhattan Supply Co	81.55
Harry L. Briggs *	61.16
John H. Tissot, jr	82.73
Class 13.—Bolts and rivets:	
J. H. Sternbergh	94.55
The Manhattan Supply Co.*	57.85
Class 14.—Brushes, etc.:	
The Manhattan Supply Co	39.90
Harry L. Briggs *	37.73
John H. Tissot, jr	42.90
Class 15.—Cement, etc.:	
The Manhattan Supply Co.*	$73.00
Class 16.—Hardware:	
The Manhattan Supply Co	600.07
Harry L. Briggs *	367.58
Class 17.—Metals:	
A. P. Swoyer	67.82
Colwell Lead Co	66.35
Oliver Bros	57.55
The Manhattan Supply Co.*	52.50
Thompson C. Gill & Co	76.90
John H. Tissot, jr	59.20
Class 18.—Packing, etc.:	
Philadelphia Machinery and Supply Co	320.61
Page Belting Co.*	315.45
New Jersey Car Spring and Rubber Co	421.50
The Gutta-Percha Rubber Co	439.65
Fiske Bros	442.75
The Manhattan Supply Co	522.20
Class 19.—Paint.§	
Class 20.—Plumbers' supplies:	
A. P. Swoyer	300.25
Colwell Lead Co	262.17
E. T. Tweddy *	175.39
Oliver Bros	199.73
The Manhattan Supply Co	197.08
Harry L. Briggs	206.02
Class 21.—Pipe and pipe fittings:	
A. P. Swoyer	77.86
Edward F. Keating	80.09
Oliver Bros	82.44
The Manhattan Supply Co	84.65
S. C. Forsaith Machine Co	82.76
Class 22.—Blacking, 3,000 boxes:	
Oliver Bros	89.10
The Manhattan Supply Co	90.00
Harry L. Briggs *	85.80
Thompson C. Gill & Co	119.70
John H. Tissot, jr	90.00
Class 23.—1,000 spoons:	
A. P. Swoyer	150.00
Oliver Bros	98.50
The Manhattan Supply Co	114.00
Harry L. Briggs	116.50
John H. Tissot, jr.*	98.40
Class 24.—Forks:	
A. P. Swoyer	150.00
Oliver Bros	98.50
The Manhattan Supply Co	114.00
Harry L. Briggs	116.50
John H. Tissot, jr.*	98.40
Class 25.—Iron plates:	
A. P. Swoyer	234.02
The Manhattan Supply Co	329.03
Frank H. Woodruff & Co.*	201.17
Class 26.—Magnesia:	
A. P. Swoyer *	60.00
Wm. B. Morgan	125.00
Oliver Bros	117.50
The Manhattan Supply Co	118.50
Harry L. Briggs	147.50
Class 27.—Asbestus:	
H. W. Johns Manufacturing Co.*	103.20
The Manhattan Supply Co	116.00
John H. Tissot, jr	110.40
Class 28.—Steel plates:	
The Carnegie Steel Co.*	1,051.87
Frank H. Woodruff & Co	1,239.02

* Accepted. † Informal. ‡ Withdrawn. § Open purchase.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Tee steel:	
rnegie Steel Co.*	$106.18
Steel rivets:	
ternbergh*	150.84
nhattan Supply Co	263.97
H. Woodruff & Co	169.69
on C. Gill & Co	150.84
Steel furnaces.†	
Brass tubes:	
wyer	1,376.20
I F. Keating	1,563.20
Class 32—Continued.	
The American Tube Works*	$1,376.20
The Manhattan Supply Co	1,376.20
Merchant & Co	1,376.20
S. C. Forsaith Machine Co	1,431.86
Class 33.—Copper plates:	
A. P. Swoyer	45.90
Merchant & Co.*	28.08
Class 34.—Grommets:	
The Vulcanized Fiber Co.*‡	34.50
The Manhattan Supply Co	34.50

for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated November 11, 1894; opened November 28, 1893.

olders' riddles:	
endall	$28.80
nhattan Supply Co	25.84
rsaith Machine Co.*	24.96
Neville	26.00
merican pig iron.	
Hoffmann	782.50
endall	775.00
nhattan Supply Co	747.50
rsaith Machine Co.*	680.00
Class 2.—American pig iron—Continued.	
Thompson C. Gill & Co	$799.50
Geo. L. Neville	1,250.00
Class 3.—Princess pig iron:	
J. B. Kendall	165.00
S. C. Forsaith Machine Co.*	152.50
George L. Neville	400.00
Class 4.—2 Water tube boilers:	
Chas. Ward§	3,000.00
Chas. D. Mosher*	3,100.00

for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated November 8, 1893; opened November 28, 1893.

orgings:	
dvale Steel Co	$216.00
thlehem Iron Co.*	187.20
own§	20.16
orgings:	
dvale Steel Co.*	396.48
thlehem Iron Co	481.44
own§	226.56
oring machine.†	
acking:	
nhattan Supply Co	200.25
. Briggs*	197.75
: Bowles	312.50
c Williams	226.00
ools:	
iladelphia Machinery and y Co	2,239.10
len Co	2,140.63
nhattan Supply Co	2,220.97
. Briggs*	1,973.49
rsaith Machine Co	2,277.72
wyer	2,220.92
ardware:	
len Co	134.72
nhattan Supply Co	138.19
. Briggs*	128.21
otash, etc.:	
nhattan Supply Co	94.63
. Pleasants*	80.42
aste:	
ros	418.30
len Co	405.30
nhattan Supply Co	467.00
ndall	449.45
Bowles	653.00
. Pleasants*	395.55
c Williams	430.00
umber:	
A. Gaskill	963.50
Class 9—Continued.	
W. I. Gallaher	$984.00
W. T. & F. B. Weaver*	849.50
Church & Stephenson	1,110.00
Class 10.—Lacing:	
Page Belting Co	66.00
William Bowles	77.00
The Heim Belting Co.*	53.00
Class 11.—Muslin:	
McFadden Co	18.90
The Manhattan Supply Co.*	17.00
Harry L. Brigg	19.75
Chas. H. Pleasants	19.00
Class 12.—Tool steels	
The Midvale Steel Co	840.00
Sanderson Bros. Steel Co	759.00
McFadden Co	977.70
J. B. Kendall	625.80
Park Bro. & Co., Limited§	
A. P. Swoyer	1,680.00
Cumberland Steel and Tin Plate Co.*	505.87
E. C. Brooks & Co	1,051.80
The Benjamin Atha & Illingworth Co	1,199.00
Class 13.—Steel:	
The Midvale Steel Co	376.70
J. B. Kendall*	207.18
Park Bro. Co., Limited	339.03
A. P. Swoyer	452.04
The Benjamin Atha & Illingworth Co	297.18
Class 14.—Files:	
G. & H. Barnett	2,157.78
The J. Barton Smith Co.*	2,016.34
Morton Reed & Co	2,197.22
Frank P. May & Co	2,136.64
McFadden Co	2,204.01
The Manhattan Supply Co	2,308.47
Harry L. Briggs	2,297.32

for supplies for the New York navy-yard, under Bureau advertisement dated November 9, 1893; opened November 28, 1893.

,000 yards trousers cloth:	
ppey & Co	$28,486.50
d. Fay & Co	30,555.00
n Vail & Co	28,030.50
nshohocken Woolen Co.*	26,700.00
,000 yards cloth for caps:	
ppey & Co	25,275.00
d. Fay & Co	25,458.00
n Vail & Co.*	24,280.50
Class 3.—Mattresses, 2,000:	
Abraham Abraham	$5,880.00
Thomas M. Farley*	5,379.00
J. W. W. Moyer	5,440.00
Wm. F. Bernstein	5,487.80
Edwin F. Tilley	5,500.00
Louis Wechsler	5,850.00
Class 4.—4,000 mattress covers:	
John H. Tissot, jr	2,699.60

Accepted. † Open purchase. ‡ By lot. § Informal.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 4—Continued.

Abraham Abraham	$2,632.80
Thos. M. Farley	2,530.80
The Manhattan Supply Co.*	2,836.00
Louis Wechsler	2,610.00
F M McWilliams	2,932.00

Class 5.—10,000 watch caps:

John H. Tissot, jr †	5,000.00

Class 6.—3 000 yards tan cotton duck:

John H. Tissot, jr *	645.00
Mt. Vernon Co	680.00
The Manhattan Supply Co	897.00
F M. McWilliams	783.75

Class 7.—2,000 spools linen tread:

John H. Tissot, jr *	116.40
Wm Wilson	116.60
The Manhattan Supply Co	148.33
Louis Wechsler	119.80

Class 8.—25,000 spools sewing silk:

John H. Tissot, jr	875.00
The Hemmway & Bartlett Silk Co	650 00
Louis Wechsler	722.50
The Brainard & Armstrong Co.*	645.00

Class 9.—10,000 dozen rubber buttons (small).

John H. Tissot, jr.*	360.00
The Manhattan Supply Co	390.00
Louis Wechsler	365 00
The India Rubber Comb Co	385.00

Class 10.—150,000 pounds salt-water soap:

Harry L. Briggs	5,745.00
John H. Tissot, jr	7,500.00
The Manhattan Supply Co.*	5,685.00
Chas. J. McKeone	5,895.00
F. M. McWilliams	6,180.00

Class 11.—3,000 tins for coffee:

Chas. E. Ahrens	900.00
Mary Beggs	942.00
The Manhattan Supply Co	1,018.20
Fiske Bros.*	819.00
Silas A. Illsley	885.00
John J. O'Rorke	885.00
F. M. McWilliams	1,177.50

Class 12.—25,000 pounds candles:

Abraham Abraham	2,687.50
Peter Comstock	3,000.00
The Manhattan Oil Co.*	2,487.00
H. Warner Ells	2,737.50
The S. C. Forsaith Machine Co	2,850.00
Hay Walker, jr	2,700.00

Class 13.—Iron safes:

Chas. H. Pleasants	195.00
John H. Tissot, jr	218.00
Wm. Henry Butter	197.00
S. C. Forsaith Machine Co	259.50
Walker L. Clark *	173.00

Class 14.—50,000 pounds pickles:

F. Foehrenbach & Co	2,687.50
James F McGuire *	2,605.27
Kemp, Day & Co	3,125.00

Class 15.—20,000 pounds rice:

Chas. E. Ahrens *	990.00
C. J. Caughey	1,100.00
Jno. J O Rorke	1,046.00

Class 16.—2,500 pounds raisins:

Chas. E. Ahrens	150.00
C. J Caughey	175.00
Jno. J. O'Rorke *	136.25

Class 17.—25,000 pounds tinned mutton:

C J. Caughey *	2,291.66
Kemp, Day & Co	3,215.00
H. M Anthony	2,862.50

Class 18.—35,000 pounds corned beef:

Chas. E. Ahrens	2,943.50
Louis H. Heymann *	2,796.00
H. M. Anthony	3,237.50

Class 19.—2,000 pounds tea:

Chas. E. Ahrens	$518.00
C. J. Caughey	474.60
Melvin A. Bronson	469.00
John J. O'Rorke *	459.40

Class 20.—2,000 gallons vinegar:

F. Foehrenbach & Co.*	189.00
Chas. E. Ahrens	220.00
James F. McGuire	197.50
John J. O'Rorke	209.80

Class 21.—5,000 pounds brawn:

Louis H. Heymann	426.00
Kemp, Day & Co.*	394.00
H. M. Anthony	537.50

Class 22.—Running lights:

Porter's Sons & Co	123.00
Wm. Porter's Sons *	113.88
The Manhattan Supply Co	122.28

Class 23.—Chart board glasses:

Chas. H. Pleasants*	26.34
The Manhattan Supply Co	40.20

Class 24.—Brass and copper tubing:

Merchant & Co.*	1,104.39
A. P Swoyer	1,104.39
Edward F. Keating	1,104.39
The Manhattan Supply Co	1,104.39
Chas. A. Moore	1,190.63
S. C. Forsaith Machine Co	1,216.61
The American Tube Works	1,104.39

Class 25.—Sheet brass:

S. C. Forsaith Machine Co.*	15.90

Class 26.—Valves:

Harry L. Briggs	84.23
Henry McShane Manufacturing Co.	77.98
E. T. Tweedy	91.80
Edward F. Keating	98.70
The Manhattan Supply Co.*	75.73
Chas. A. Moore	94.77

Class 27.—Gauges, etc.:

Edward F. Keating	124.03
The Manhattan Supply Co	108.30
Chas. A. Moore	107.08
Crosby Steam Gauge and Valve Co.*	102.63

Class 28.—Safety valve:

Chas. A. Moore †	98.75

Class 29.—Radiators:

A. P. Swoyer*	156.70

Class 30.—Pipe, etc.:

Henry McShane Manufacturing Co	81.62
Edward F. Keating *	72.44
The Manhattan Supply Co	80.94
S. C. Forsaith Machine Co	109.95

Class 31.—Jenkins valves:

Harry L. Briggs	121.76
Henry McShane Manufacturing Co.*	96.32
E. T. Tweedy	99.90
Edward F. Keating	99.60
The Manhattan Supply Co	126.30

Class 32.—Valves:

Edward F. Keating *	66.00
The Manhattan Supply Co	106.50
Chas. A. Moore	108.00

Class 33.—Pipe fittings:

Harry L. Briggs	86.18
Henry McShane Manufacturing Co.*	76.46
The Manhattan Supply Co	98.10

Class 34.—Water tube boilers.

Chas. D. Mosher *	3,900.00
Chas. Ward	3,500.00

Class 35.—Boiler covering, etc.

H. W. Johns Manufacturing Co	1,803.58
R. M. Gilmour Manufacturing Co.*	1,784.10
Wm. B. Morgan	1,834.83
F. J. Gast §	1,143.00

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated November 17, 1893; opened December 5, 1893.

Class 1.—Lubricating oil:

The Manhattan Oil Co	$149.80
Fiske Bros	155.00
Clarkson & Ford *	138.00

Class 2.—Lard oil:

The Manhattan Oil Co	1,505.00

Class 2—Continued.

The Standard Oil Co.*	$494.50
The New York Lubricating Oil Co.	1,720.00
Clarkson & Ford	989.00
The Vacuum Oil Co	2,128.50

* Accepted. † No award. ‡ By lot. § Informal.

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated November 10, 1893; opened December 5, 1893.

Class 1.—Nails, etc.:	
Dunham, Carrigan & Hayden Co	$71.94
Albert Gallatin*	67.43
Miller, Sloss & Scott	75.90
Wakefield Baker	74.77
Class 2.—Oregon pine:	
William Walker	4,540.71
R. J. R. Aden	4,115.15
Abraham Powell*	3,917.90
A. S. Carman	4,340.00
F. W. Kreling & Sons	4,138.76
Class 3.—1 floor grinder:	
The Pacific Tool and Supply Co	58.94
Park & Lacy Co.*	55.00
S. C. Forsaith Machine Co	70.00
E. M. C. Davis†	55.00
Miller, Sloss & Scott	74.00
Class 4.—Leather belting:	
The Pacific Tool and Supply Co	45.00
Dunham, Carrigan & Hayden Co	34.80
Albert Gallatin*	29.20
Charles C. Nichols	32.60
Park & Lacy Co.	38.00
Milton H. Cook	30.00
E. M. C. Davis	52.30
Miller, Sloss & Scott	36.40
Class 5.—Drill press:	
The Lodge & Davis Machine Tool Co.*	280.00
Class 5—Continued.	
The Aurora Tool Works†	$275.00
Park & Lacy Co	344.00
S. C. Forsaith Machine Co	370.00
E. M. C. Davis	320.00
Miller, Sloss & Scott	387.90
Class 6.—Tools:	
The Pacific Tool and Supply Co.*	89.37
Dunham, Carrigan & Hayden Co	93.84
Albert Gallatin	115.80
S. C. Forsaith Machine Co	126.43
Miller, Sloss & Scott	107.37
Class 7.—Leather:	
Chas. C. Nichols	127.00
William Frank*	110.40
Milton H. Cook	138.80
Chas. Mayne	154.40
Miller, Sloss & Scott	138.00
Class 8.—Bolts:	
Dunham, Carrigan & Hayden Co	414.10
Albert Gallatin*	413.42
Miller, Sloss & Scott	535.34
Class 9.—Iron pipe:	
Dunham, Carrigan & Hayden Co.*	68.80
Albert Gallatin	72.00
Miller, Sloss & Scott	92.80
Class 10.—Mineral oil:	
The Standard Oil Co	200.00
W. F. Whittier	200.00
J. N. Knowles*	185.00

Proposals for supplies for the navy-yard, League Island, Pa., undre Bureau advertisement dated December 1, 1893; opened December 19, 1893.

Class 1.—Drainage plant:	
Donegan & Swift	$2,157.00
Southwark Foundry and Machine Co.*	3,100.00

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated December 9, 1893; opened December 27, 1893.

Class 1.—Chrome steel plates:	
Park, Bro. & Co., Limited*	$924.21
The Midvale Steel Co	950.13
Class 2.—Cement:	
James H. McGill*	318.00
Thornton N. Motley & Co	395.00
Cammack & Decker	327.00
Clark Bros	375.00
J. T. Walters & Sons	375.00
George L. Neville	375.00
Class 3.—Sand and broken stone:	
Walter F. Hewitt	546.48
J. B. Kendall	477.84
Chas. G. Smith & Son*	359.04
Clark Bros	480.48
J. T. Walker Sons	633.60
Geo. L. Neville	1,003.20
Class 4.—Manila rope:	
The John Goode Cordage and Machine Co.*	11.03
Thornton N. Motley & Co	12.75
J. T. Walker Sons	18.00
Geo. L. Neville	13.50
The Manhattan Supply Co	15.00
Class 5.—Hardware:	
Thompson C. Gill & Co	57.00
Thornton N. Motley & Co	37.45
Bradford, Kennedy Sons & McGuire*	31.75
J. B. Kendall	49.00
J. T. Walker Sons	47.50
Geo. L. Neville	66.50
The Manhattan Supply Co	45.00
Class 6.—Pine lumber:	
Thos. W. Smith*	273.67
Geo. L. Neville	328.41
Class 7.—Brick:	
Thos. W. Smith	80.00
J. B. Kendall*	69.00
Clark Bros	100.00
J. T. Walker's Sons	70.80
S. W. Numeyer	99.80
Geo. L. Neville	150.00
Class 8.—Tin:	
The S. C. Forsaith Machine Co	$2,174.00
Jesse Lewisohn	2,099.00
Merchant & Co	2,200.00
J. B. Kendall	2,160.00
James Clendenin*	2,082.00
The American Metal Co	2,130.00
Geo. L. Neville	2,300.00
The Manhattan Supply Co	2,249.00
Class 9.—Zinc:	
The S. C. Forsaith Machine Co	898.00
Jesse Lewisohn*	770.00
Merchant & Co	1,600.00
J. B. Kendall	790.00
James Clendenin	780.00
Geo. L. Neville	840.00
Class 10.—Copper:	
Jesse Lewisohn	10,490.00
J. B. Kendall*	10,280.00
James Clendenin	10,680.00
The American Metal Co	10,350.00
Geo. L. Neville	11,250.00
Class 11.—Indian lead:	
Wm. J. Coane*	54.00
J. B. Kendall	72.00
Class 12.—Crucibles:	
Wm. J. Coane	175.00
Thompson C. Gill & Co	199.00
Thornton N. Motley & Co	252.00
The S. C. Forsaith Machine Co	191.00
Merchant & Co.*	160.00
James Clendenin	229.00
Geo. L. Neville	270.00
The Manhattan Supply Co	178.00
Class 1.—Valves:	
Cuyler & Mohler	1,100.64
The Kennedy Valve Manufacturing Co	1,374.96
E. T. Hull	2,441.28
Thornton N. Motley & Co	1,053.71
Pancoast & Rogers	1,099.94
S. C. Forsaith Machine Co	1,059.96

*Accepted. †Informal.

Proposals for stationery for the navy-yard, Norfolk, Va., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co	$198.77
The Burrows Stationery Co.*	165.37
Hume & Bilisoly	183.62
Class 2:	
Manhattan Supply Co	527.75
The Burrows Stationery Co.*	302.03
Hume & Bilisoly	434.58
Class 3:	
Manhattan Supply Co.*	108.72
Wm. Ballantyne & Sons	218.59
The Burrows Stationery Co	185.37
Hume & Bilisoly	188.05
Class 4:	
Old Dominion Paper Co	204.21
Manhattan Supply Co.*	176.53
Wm. Ballantyne & Sons	234.17
The Burrows Stationery Co	190.91
Hume & Bilisoly	223.56
Class 5:	
Manhattan Supply Co	300.44
The Burrows Stationery Co	300.40
Hume & Bilisoly*	266.47
Class 6:	
Manhattan Supply Co.*	211.86
The Burrows Stationery Co	229.32
Hume & Bilisoly	229.84
Class 7:	
Old Dominion Paper Co	111.47
Manhattan Supply Co	111.42
The Burrows Stationery Co	105.52
Hume & Bilisoly*	94.52
Class 8:	
Old Dominion Paper Co	97.72
Manhattan Supply Co	96.38
The Burrows Stationery Co.*	91.69
Hume & Bilisoly	94.86
Class 9:	
Old Dominion Paper Co.*	89.30
Manhattan Supply Co	91.75
Wm. Ballantyne & Sons	104.63
The Burrows Stationery Co	101.61
Hume & Bilisoly	120.89
Class 10:	
Old Dominion Paper Co	95.17
Manhattan Supply Co	98.79
Wm. Ballantyne & Sons	94.48
The Burrows Stationery Co	93.15
Hume & Bilisoly*	91.91
Class 11:	
Manhattan Supply Co.*	138.87
The Burrows Stationery Co	156.97
Hume & Bilisoly	146.28
Class 12:	
Manhattan Supply Co	237.35
The Burrows Stationery Co	233.14
Hume & Bilisoly*	231.00
Class 13:	
Manhattan Supply Co	482.00
Frost & Adams	557.85
The Burroughs Stationery Co	538.83
Hume & Bilisoly*	461.71

Proposals for stationery for naval station, Key West, Fla., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co.*	$90.63

Proposals for stationery for navy-yard, Pensacola, Fla., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Manhattan Supply Co.*	$204.85

Proposals for stationery for navy-yard, Mare Island, Cal., under Bureau advertisement dated September 16, 1893; opened October 10, 1893.

Class 1:	
Cunningham, Curtis & Welch	$386.10
Dutton & Partridge	391.47
J. P. Lecount	434.60
Payot, Upham & Co.*	383.32
H. S. Crocker Co	894.85
Manhattan Supply Co	410.75
Class 2:	
Cunningham, Curtis & Welch	1,111.45
Dutton & Partridge	1,121.65
J. P. Lecount	1,168.20
Payot, Upham & Co.*	1,110.85
H. S. Crocker Co	1,130.13
Manhattan Supply Co	1,149.95
Class 3:	
Cunningham, Curtis & Welch*	511.63
Dutton & Partridge	516.25
J. P. Lecount	528.50
Payot, Upham & Co	529.25
Manhattan Supply Co	548.20
Class 4:	
Cunningham, Curtis & Welch*	506.65
Dutton & Partridge	508.90
J. P. Lecount	542.85
Payot, Upham & Co	522.95
Manhattan Supply Co	544.60
Class 5:	
Cunningham, Curtis & Welch	577.20
Dutton & Partridge	571.68
J. P. Lecount*	570.38
Payot, Upham & Co	590.63
H. S. Crocker Co	585.60
Manhattan Supply Co	624.60
Class 6:	
Cunningham, Curtis & Welch	$291.60
Dutton & Partridge*	277.26
J. P. Lecount	292.48
Payot, Upham & Co	292.85
H. S. Crocker	282.87
Manhattan Supply Co	311.66
Class 7:	
Cunningham, Curtis & Welch	202.80
Dutton & Partridge	195.00
J. P. Lecount	193.35
Payot, Upham & Co	213.60
H. S. Crocker Co.*	192.50
Manhattan Supply Co	217.70
Class 8:	
Cunningham, Curtis & Welch	108.25
Dutton & Partridge*	103.39
J. P. Lecount	105.90
Payot, Upham & Co	109.98
H. S. Crocker Co	106.00
Manhattan Supply Co	111.64
Class 9	
Cunningham, Curtis & Welch	68.60
Dutton & Partridge*	67.96
J. P. Lecount	73.50
Payot, Upham & Co	74.65
H. S. Crocker Co	68.65
Manhattan Supply Co	74.25
Class 10:	
Cunningham, Curtis & Welch	51.30
Dutton & Partridge*	48.82
J. P Lecount	51.93
Payot, Upham & Co	50.13
H. S. Crocker & Co	51.20
Manhattan Supply Co	52.65

*Accepted.

eals for supplies for the navy-yard, League Island, Pa., etc.—Continued.

ools:	
. Briggs	$823.28
nhattan Supply Co	906.40
Field	1,066.99
phia Machinery and Sup-	
*	805.35
saith Machine Co	1,220.90
etals:	
H. Pleasants*	665.81
nhattan Supply Co	922.92
oyer	790.00
ar iron:	
on C. Gill & Co	370.86
Chain Works	120.52
nhattan Supply Co	203.97
oyer	122.38
Field*	117.44
ar steel:	
on C. Gill & Co	117.27
nhattan Supply Co	130.30
ijamin Atha & Illingworth	
	74.92
oyer	104.24
Field	87.95
o. & Co., Limited:	
A	77.53
B	155.71
C	207.83
locks:	
nhattan Supply Co.*	58.80
oyer	81.18
acking, etc.:	
nhattan Supply Co	1,648.15
y Sayen*	1,261.72
aints:	
H. Pleasants	427.61
ter & Busch	417.59
nhattan Supply Co	451.95
line & French Co	387.68
oyer	414.29
Pemberton*	345.61
. Childs & Co	377.75
hite lead:	
Pleasants	74.00
cer & Busch	67.40
line & French Co.*	55.00
oyer	65.00
Pemberton	57.30
. Childs & Co	75.00
ill & Bro	57.50

Class 18.—Cocks, etc.:	
A. P. Swoyer*	$549.00
Class 19.—Seamless pipes:	
James Clendenin*	142.04
A. P. Swoyer	163.12
Merchant & Co	200.11
E. F. Keating	198.48
S. C. Forsaith Machine Co	144.80
Class 20.—Valves, brass.	
McCambridge & Co	116.02
E. F. Keating	53.06
Charles J. Field*	89.90
S. C. Forsaith Machine Co	52.98
E. T. Tweedy	47.78
Class 21.—Pipe fittings, brass:	
McCambridge & Co	179.38
E. F. Keating	104.52
Charles J. Field*	96.79
S. C. Forsaith Machine Co	116.94
E. T. Tweedy	97.45
Class 22.—Pipe fittings, iron:	
Charles J. Field*	320.02
S. C. Forsaith Machine Co	364.43
Class 23.—Gaskets, etc.:	
The Manhattan Supply Co	1,097.19
W. Henry Sayen	758.30
Philadelphia Machinery Supply Co.*	725.21
Class 24.—Stationery:	
The Manhattan Supply Co.*	152.02
Weil & Taws	224.06
Class 25.—Tools:	
Harry L. Briggs*	1,755.71
The Manhattan Supply Co	2,075.65
A. P. Swoyer	1,893.20
Charles J. Field	1,931.63
Class 26.—Files:	
Harry L. Briggs	52.16
Charles J. Field*	51.26
Class 27.—Trucks:	
Harry L. Briggs*	23.00
Thompson C. Gill & Co	59.96
The Manhattan Supply Co	27.60
Rhiele Bros	40.00
Class 28.—Waste:	
Charles H. Pleasants*	112.35
Thompson C. Gill & Co	127.35
Shoemaker & Busch	157.35
The Manhattan Supply Co	133.50
A. P. Swoyer	120.00

for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated December 8, 1893; opened January 2, 1894.

ocks:	
Sloss & Scott*	$72.00
ardware:	
. Briggs	188.65
Sloss & Scott	213.45
, Carrigan & Hayden Co.*	168.48
lting:	
. Hayes	191.79
Sloss & Scott	248.50
Nichols	194.38
Rubber Co	211.25
H. Cook*	190.44
, Carrigan & Hayden Co	224.52
bina bronze:	
onia Brass and Copper Co.*	427.61
Sloss & Scott	519.03

Class 5.—Blocks:	
Miller, Sloss & Scott	$132.00
S. C. Forsaith Machine Co	146.00
Dunham, Carrigan & Hayden Co.*	125.20
Class 6.—Packing, etc.:	
Miller, Sloss & Scott	235.70
Boston Woven Hose and Rubber Co.*	144.00
Bowers Rubber Co	183.60
Class 7.—Tools:	
Miller Sloss & Scott	429.50
S. C. Forsaith Machine Co.*	367.75
Dunham, Carrigan & Hayden Co	425.80
Class 8.—Tool steel:	
Miller, Sloss & Scott	52.80
Dunham, Carrigan & Hayden Co.*	25.58

* Accepted.

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated December 29, 1893; opened January 16, 1894.

Class 1.—One horizontal boring, milling, and drilling machine:	
The Miles Tool Works Co	$13,730.00
Bement Miles & Co.*	12,734.00
Class 2.—Steel castings: †	
The Benjamin Atha & Illingworth Co	2,187.92
Penn Steel Casting and Machine Co.	2,148.85
The Solid Steel Co	3,516.30
Standard Steel Casting Co	2,305.13
Receivers of the Pennsylvania Steel Co	2,734.90
The Midvale Steel Co	2,344.20
Class 3.—Oak timber: †	
Geo. L. Neville	5,394.48
Class 3.—Oak timber—Continued.	
W. T. & F. B. Weaver	$3,882.00
Edwin A. Gaskill	4,448.61
Church & Stevenson	4,567.10
W. T. Gallaher	4,881.61
L. A. Clarke	3,962.40
Class 4.—Steel plates:	
The Carbon Steel Co.*	462.00
Class 6.—Rivets:	
J. H. Sternbergh	75.00
Geo. L. Neville	105.00
Thompson C. Gill & Co.*	62.70
S. C. Forsaith Machine Co	81.40

Proposals for supplies for the New York navy-yard under Bureau advertisement dated December 27, 1893; opened January 16, 1894.

Class 1.—Flannel lining, etc.:	
The Manhattan Supply Co	$1,498.90
Abraham Abraham	1,475.25
John H. Tissot, jr.*	1,441.75
Class 2.—Twills:	
The Manhattan Supply Co	647.00
Abraham Abraham	648.00
John H. Tissot, jr.*	624.00
Louis Wechsler	637.50
Class 3.—Basting cotton, etc.:	
The Manhattan Supply Co	482.80
Abraham Abraham	508.00
John H. Tissot, jr.*	476.80
Louis H. Wechsler	530.80
Wm. Wilson	515.00
Class 4.—Sewing silk:	
Abraham Abraham	552.75
John H. Tissot, jr	605.62
Louis Wechsler	532.28
The Richardson Silk Co.*	512.00
Brainard & Armstrong Co	526.60
Heminway & Bartlett Silk Co	530.00
Class 5.—Silk laces.	
John H. Tissot, jr.*	96.00
Class 6.—Bone buttons.	
The Manhattan Supply Co	42.00
Abraham Abraham	375.00
Class 6—Continued.	
Thos. G. Hood	$38.00
John H. Tissot, jr	34.20
Louis Wechsler*	30.00
Class 7.—Rubber buttons:	
The Manhattan Supply Co	634.00
Thomas G. Hood*	563.80
John H. Tissot, jr	593.00
Louis Wechsler	608.00
Class 8.—Cap device buttons:	
Thomas G. Hood*	48.75
Class 9.—Cap leathers:	
The Manhattan Supply Co.*	72.80
H. H. Woodrough	68.50
John H. Tissot, jr	89.00
Class 10.—20,000 pairs woolen socks:	
Thos. G. Hood	6,290.00
B. Z. Pippey & Co	6,150.00
Jno. H. Tissot, jr	7,400.00
A. P. Olzendam ‡	4,900.00
Class 11.—Iron:	
Eugene L. Maxwell	2,311.50
The Pennsylvania Bolt and Nut Co.*	2,130.90
Brown & Co	3,185.00
Hannibal Greene's Son & Co	2,361.20
S. C. Forsaith Machine Co	2,166.40

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated December 28, 1893; opened January 23, 1894.

Class 1.—Boiler tubes for U. S. S. *Boston:*	
The Tyler Tube & Pipe Co	$2,690.25
Dunham, Carrigan & Hayden Co	2,167.50
S. C. Forsaith Machine Co	2,686.00
The Allison Manufacturing Co.*	2,125.00
Morris Tasker & Co	2,414.00
Miller, Sloss & Scott	4,590.00
Pancoast & Rogers	2,227.00
Class 2.—Boiler tubes for U. S. S. *Yorktown:*	
The Tyler Tube & Pipe Co	1,344.00
Dunham, Carrigan & Hayden Co	1,267.50
S C. Forsaith Machine Co	1,363.50
The Allison Manufacturing Co.*	1,033.00
Morris Tasker & Co	1,363.50
Miller, Sloss & Scott	2,082.00
Pancoast & Rogers	1,129.50
Class 3.—Pumps:	
M. T. Davidson*	395.00
S. C. Forsaith Machine Co	471.00
Class 4.—Bolts, etc.:	
Dunham, Carrigan & Hayden Co.*	44.10
Miller, Sloss & Scott	47.55
Class 5.—Hardware:	
Dunham, Carrigan & Hayden Co	227.61
Miller, Sloss & Scott	269.44
Harry L. Briggs*	218.09
Class 6.—Rubber mats, etc.:	
Bowers Rubber Co	69.00
Miller, Sloss & Scott	81.50
Arnett & Rivers*	68.50
Class 7.—Tools:	
Dunham, Carrigan & Hayden Co.*	$313.04
S. C. Forsaith Machine Co	399.73
Miller, Sloss & Scott	357.63
Harry L. Briggs	314.52
Class 8.—Zinc, etc.:	
S. C. Forsaith Machine Co.*	401.70
Miller, Sloss & Scott	414.10
The Pacific Metal Works	412.30
Class 9.—Packing, etc.:	
Dunham, Carrigan & Hayden Co	101.25
Miller, Sloss & Scott	125.25
Boston Woven Hose and Rubber Co.*	82.00
Revere Rubber Co. ‡	
Class 10.—Hose:	
S. C. Forsaith Machine Co	1,000.00
Bowers Rubber Co	749.00
The Gutta Percha and Rubber Manufacturing Co	831.50
Boston Woven Hose and Rubber Co.*	657.50
Arnett & Rivers	772.00
Revere Rubber Co	732.50
Class 11.—Varnish, etc..	
Miller, Sloss & Scott*	91.80
Class 12.—Gauges:	
Dunham, Carrigan & Hayden Co	57.00
S. C. Forsaith Machine Co	93.00
Crosby Steam Gauge and Valve Co.*	54.00
Miller, Sloss & Scott	58.14

* Accepted. † No award. ‡ Informal.

posals for supplies for the navy-yard, Mare Island, Cal., etc.—Continued.

-Tools:	
m, Carrigan & Hayden Co...	$1,156.15
orsaith Machine Co.....	1,155.71
. Sloss & Scott	1,248.78
L. Briggs*.....	1,105.40
-Soap, waste, etc.:	
m, Carrigan & Hayden Co...	384.50
, Sloss & Scott	428.50
laurath & Co.—	
d A	427.00
d B.....	373.00
H. Dowling—	
d A.....	394.00
d B*.....	324.00
Levi, jr.....	393.75
-Oatmeal:	
Marine Supply Co.....	50.00
s H. Dowling.....	49.50
Levi, jr.*.....	48.50
-Wheat flour:	
H. Dowling*.....	208.00
-Rice:	
Marine Supply Co.....	93.80
H. Dowling	92.40
Levi, jr.*.....	88.00
-Dried apples:	
Marine Supply Co.*.....	73.60
H. Dowling	107.50
Levi, jr.....	90.00
-Dried peaches:	
Marine Supply Co.*.....	89.10
H. Dowling	96.25

Class 19—Continued.	
Jacob Levi, jr.....	$95.00
Class 20.—Dried currants:	
Pacific Marine Supply Co	24.55
Thos. H. Dowling.....	30.00
Jacob Levi, jr.*	23.75
Class 21.—Raisins:	
Pacific Marine Supply Co.*	22.30
Thos. H. Dowling.....	32.50
Jacob Levi, jr.....	22.50
Class 22.—Prunes:	
Pacific Marine Supply Co.	34.55
Thos. H. Dowling.....	42.50
Jacob Levi, jr.....	37.50
Class 23.—Tomatoes:	
Pacific Marine Supply Co	120.00
Thos. H. Dowling.....	153.00
Jacob Levi, jr.*	116.10
Class 24.—Salmon:	
Thos. H. Dowling*.....	201.00
Jacob Levi, jr.....	294.00
Class 25.—Sugar:	
Thos. H. Dowling*.....	720.00
Jacob Levi, jr.....	741.00
Class 26.—Sirup:	
Pacific Marine Supply Co.*	88.75
Thos. H. Dowling.....	97.50
Jacob Levi, jr.....	95.00
Class 27.—Vinegar:	
Pacific Marine Supply Co	50.00
Thos. H. Dowling*.....	47.50
Jacob Levi, jr.....	70.00

s for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated January 4, 1894; opened January 23, 1894.

3. Morgan.....	$3,298.95
Johns Manufacturing Co....	3,442.75

Class 1—Continued.	
A. P. Swoyer & Co.*	$3,134.06
R. M. Gilmour Manufacturing Co ..	3,979.04

s for supplies for the navy-yard, New York, N. Y., under Bureau advertisement dated January 3, 1894; opened January 23, 1894.

3. Morgan.....	$3,298.95
Johns Manufacturing Co....	3,442.75

Class 1—Continued.	
A. P. Swoyer & Co.*	$3,134.06
R. M. Gilmour Manufacturing Co ..	3,502.77

s for supplies for the New York navy-yard under Bureau advertisement dated January 12, 1894; opened January 30, 1894.

0,000 gallons beans:	
E. Ahrens	$3,589.00
aughey.....	3,900.00
anhattan Supply Co	3,535.00
. O'Rorke*	3,499.00
5,000 pounds flour:	
E. Ahrens	1,462.50
aughey....	1,417.50
Smith.....	1,575.00
anhattan Supply Co.....	1,417.50
. O'Rorke.....	1,406.25
,500 pounds prunes:	
E. Ahrens*.....	250.00
aughey.....	375.00
. O'Rorke.....	255.75
25,000 pounds sugar:	
E. Ahrens*.....	5,412.50
aughey.....	5,537.50
anhattan Supply Co.....	5,312.50
. O'Rorke*	5,206.87
0,000 pounds salt beef:	
E. Ahrens	3,450.00
McWilliams.....	3,600.00
F. Mattlage.....	3,925.00
aughey*	3,190.00
00,000 pounds salt pork:	
F. Ahrens	9,320.00
McWilliams	9,650.00
E. Mattlage	9,320.00
& Bro*	8,990.00

Class 7.—4,000 pounds tea:	
Chas. E. Ahrens	$1,024.00
C. J. Caughey	887.60
The Manhattan Supply Co	1,119.20
John J. O'Rorke*	858.80
M. A. Bronson	898.00
Class 8.—40,000 pounds roast beef:	
Chas. E. Ahrens*.....	3,080.00
Louis H. Heymann	3,356.00
H. M. Anthony	3,333.33
C. J. Caughey.....	3,333.33
Class 9.—40,000 pounds ham:	
Louis H. Heymann*.....	5,396.00
H. M. Anthony	8,000.00
Class 10.—2,000 pounds sausage:	
H. M. Anthony*.....	2,170.00
Kemp, Day & Co	2,500.00
Class 11.—3,000 papers needles:	
John H. Tissot, jr.....	87.00
The Manhattan Supply Co.*.....	81.00
Francis Harral.....	85.20
Class 12.—4,000 boxes blacking:	
F. M. McWilliams.....	124.00
John H. Tissot, jr.....	118.00
The Manhattan Supply Co.*.....	109.20
John J. O'Rorke.....	136.40
Francis Harral.....	113.60
Class 13.—2,000 coarse combs:	
John H. Tissot, jr.*	94.00

* Accepted.

Proposals for supplies for the navy-yard, Norfolk, Va., etc.—Continued.

Class 38:	
George L. Neville	$400.00
Harry L. Briggs	387.50
Manhattan Supply Co	415.50
Ira B. White*	374.00
Chas. H. Pleasants	399.49
Class 39:	
George L. Neville	$368.15
Harry L. Briggs*	293.92
Manhattan Supply Co	324.13
McFadden Co	296.62
Ira B. White	317.06

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated September 27, 1893; opened October 24, 1893.

Class 1:	
Thompson C. Gill & Co	$176.00
Dunham, Carrigan & Hayden Co.*	108.00
Class 2:	
Miller, Sloss & Scott	655.00
Dunham, Carrigan & Hayden Co	648.90
Manhattan Supply Co.*	509.00
Class 3:	
Miller, Sloss & Scott	172.50
Dunham, Carrigan & Hayden Co.*	116.00
J. N. Knowles	140.00
Louis E. Lake	153.00
Fiske Bros*	130.00
Class 4:	
S. C. Forsaith Machine Co	$883.98
Miller, Sloss & Scott	1,163.30
Dunham, Carrigan & Hayden Co.*	777.05
Class 5:	
Vacuum Oil Co	1,500.00
Standard Oil Co	2,487.50
F. N. Woods	3,475.00
Sanford Taylor	2,450.00
J. N. Knowles	5,000.00
American Oil Co	2,650.00
Fiske Bros.*	1,262.50

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated October 4, 1893; opened October 24, 1893.

Class 1:	
J. B. Morrell & Co	$688.50
Harry L. Briggs	718.17
John J. Wheeler	930.03
Clifford Pemberton	689.82
Manhattan Supply Co.*	655.75
Class 2:	
J. B. Morrell & Co.*	4,026.00
G. K. Sheridan & Co	357.00
Henry C. Broking	4,043.50
Class 3:	
Harry L. Briggs	147.94
Bradford, Kennedy Sons & McGuire	123.80
Shoemaker & Busch*	116.90
Manhattan Supply Co	135.10
Class 4:	
Abraham F. Underwood	587.19
Harry L. Briggs	585.85
S. C. Forsaith Machine Co	686.75
Bradford, Kennedy Sons & McGuire	541.90
Manhattan Supply Co.*	524.59
Class 5:	
Heim Belting Co.*	199.00
Page Belting Co*	232.75
Manhattan Supply Co	211.00
Loeb Bros	219.00
Class 6:	
Watson & Pittinger*	573.30
Charles E. Pell	612.70
Wm. R. Adams	656.00
C. F. Hodsdon	641.00
Joseph W. Duryee	631.80
Class 7:	
Watson & Pittinger	2,175.00
Chas. E. Bell*	2,105.25
Wm. R. Adams	2,550.00
S. C. Forsaith Machine Co	3,087.50
C. F. Hodsdon	2,347.50
Joseph W. Duryee	2,460.00
Class 8:	
Watson & Pittinger	288.00
Chas. E. Pell	516.00
Wm. R. Adams	300.00
C. F. Hodsdon	360.00
Joseph W. Duryee*	274.80
Class 9:	
Ajax Metal Co	(†)
Eugene L. Maxwell	278.70
Bridgeport Deoxidized Bronze and Metal Co	(†)
Manhattan Supply Co.*	261.00
Class 10:	
Chas. M. Childs & Co	1,726.00
Phœnix Paint Co.*	1,296.00
J. B. Morrell & Co	1,947.50
Aquila Rich	1,481.00
Harry L. Briggs	1,671.50
Class 10—Continued.	
Fiske Bros	$1,642.50
Clifford Pemberton	1,612.00
Shoemaker & Busch	1,483.00
Smith, Kline & French Co	1,700.50
Class 11:	
Chas. M. Childs & Co.*	1,335.65
Aquila Rich	1,408.41
Fiske Bros	1,387.80
Clifford Pemberton	1,373.80
Shoemaker & Busch	1,840.62
Smith, Kline & French Co	1,434.80
Class 12:	
Aquila Rich	1,497.00
Smith, Kline & French Co.*	1,334.00
Class 13:	
Manhattan Oil Co	5,010.00
Fiske Bros.*	4,708.50
Class 14:	
Chas. M. Childs & Co	1,862.50
Phœnix Paint Co	1,880.00
J. B. Morrell & Co	2,000.00
Aquila Rich	2,020.00
S. C. Forsaith Machine Co	1,880.00
Manhattan Oil Co	2,010.00
Fiske Bros	1,919.00
Smith, Kline & French Co.*	1,740.00
Class 15:	
J. B. Morrell & Co	59.00
Aquila Rich	65.00
Manhattan Oil Co	57.75
Fiske Bros.*	48.50
Class 16:	
Chas. M. Childs & Co	2,320.00
J. B. Morrell & Co	1,740.00
Aquila Rich	1,520.00
Fiske Bros.*	1,460.00
Smith, Kline & French Co	1,570.00
Class 17:	
Wm. W. Lawrence	2,950.00
Phœnix Paint Co	3,150.00
Aquila Rich	3,000.00
S. C. Forsaith Machine Co	3,065.00
Wetherill & Bro	3,075.00
Clifford Pemberton*	2,739.90
Smith, Kline & French Co	2,800.00
Harry L. Briggs	2,740.00
Class 18:	
Chas. M. Childs & Co	1,480.00
Wm. W. Lawrence	1,675.00
Aquila Rich	1,558.00
S. C. Forsaith Machine Co	1,478.00
Clifford Pemberton	1,587.96
Smith, Kline & French Co.*	1,290.00

* Accepted.

† Informal

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 19:	
Wm. W. Lawrence	$2,875.00
Phœnix Paint Co	3,000.00
S. C. Forsaith Machine Co	2,920.00
Wetherill & Bro	2,925.00
Clifford Pemberton*	2,619.70
Smith, Kline & French Co	2,800.00
Harry L. Briggs	2,745.00
Class 20:	
Abraham F. Underwood	655.40
Harry L. Briggs	557.60
Class 20—Continued.	
Bradford, Kennedy Sons & McGuire	$549.77
Manhattan Supply Co.*	547.75
Class 21:	
J. B. Morrell & Co	602.00
Harry L. Briggs	613.50
Fiske Bros.*	541.70
Bradford, Kennedy Sons & McGuire	577.50
Eugene L. Maxwell	549.25
Shoemaker & Busch	619.00
Manhattan Supply Co	581.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated October 3, 1893; opened October 31, 1893.

Class 1.—Brushes, etc.:	
Miller, Sloss & Scott	$312.55
Huntington-Hopkins Co	297.72
Dunham, Carrigan & Hayden Co	303.50
Wakefield Baker*	280.03
Class 2.—Leather:	
Miller, Sloss & Scott*	61.00
Chas. H. Pleasants	85.75
Class. 3.—Lumber:	
Wm. Walker*	1,337.62
Abraham Powell	1,635.00
Benton Holmes & Co	1,800.00
R. J. R. Aden	1,865.00
F. W. Kreling & Sons	1,414.50
Class 4.—Tool steel:	
Park, Brother & Co	230.00
Miller, Sloss & Scott	181.12
Huntington-Hopkins Co	86.75
Dunham, Carrigan & Hayden Co.*	86.13
Thompson C. Gill & Co	103.50
Class 5.—Mild steel:	
Miller, Sloss & Scott*	533.43
Dunham, Carrigan & Hayden Co	573.28
Class 6.—Brass:	
W. F. Garratt & Co	110.00
Miller, Sloss & Scott	98.75
Dunham, Carrigan & Hayden Co.*	89.95
Class 7.—Ingot copper:	
W. F. Garratt & Co.*	388.00
Miller, Sloss & Scott	476.25
Dunham, Carrigan & Hayden Co	401.50
Class 8.—Packing:	
Bowers Rubber Co	770.00
Class 8—Continued.	
Boston Woven Hose and Rubber Co.*	$527.50
Miller, Sloss & Scott	915.00
Arnett & Rivers	693.00
Fiske Bros	661.75
Class 9.—Alcohol:	
W. F. Whittier*	468.00
Class 10.—White lead:	
Chas. M. Childs & Co	375.00
W. F. Whittier*	266.50
Chas. M. Yates	281.25
Class 11.—Turpentine, etc.:	
Chas. M. Childs & Co	576.00
W. F. Whittier	499.50
Chas. M. Yates*	480.75
Chas. H. Pleasant	630.00
Class 12.—Pipe, etc.:	
Wm. Walker	1,047.27
Phelps & Arnold	1,067.54
W. F. Garratt & Co	1,046.59
Miller, Sloss & Scott	1,190.75
S. C. Forsaith Machine Co	1,034.71
Dunham, Carrigan & Hayden Co.*	993.12
Class 13.—Cotton waste:	
Miller, Sloss & Scott	179.80
Huntington-Hopkins Co	190.00
W. F. Whittier	178.00
Dunham, Carrigan & Hayden Co	179.80
Fiske Bros	175.00
Chas. H. Pleasants	199.80
Wakefield Baker*	165.00
Wadham's Oil and Grease Co	200.00
Thompson C. Gill & Co	220.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated October 10, 1894; opened November 7, 1893.

Class 1.—Nuts, rivets, etc.:	
Bradford, Kennedy Sons & McGuire*	$231.69
Miller, Sloss & Scott	491.85
Dunham, Carrigan & Hayden Co	284.97
Class 2.—Brooms and brushes:	
Miller, Sloss & Scott*	95.40
Louis E. Lake	99.75
Class 3.—Cement:	
Miller, Sloss & Scott*	76.00
Dunham, Carrigan & Hayden Co	79.00
Class 4.—Rope:	
Bradford, Kennedy Sons & McGuire*	139.00
Miller, Sloss & Scott	240.44
S. C. Forsaith Machine Co	176.14
Dunham, Carrigan & Hayden Co	170.44
Chas. H. Pleasants	217.63
Class 5.—Thread, etc.:	
Miller, Sloss & Scott*	15.50
Class 6.—Hardware:	
Miller, Sloss & Scott	930.56
Harry L. Briggs*	774.37
Dunham, Carrigan & Hayden Co	796.96
Class 7.—Leather, etc.:	
Miller, Sloss & Scott	477.60
Dunham, Carrigan & Hayden Co	415.97
Chas. C. Nichols*	407.86
Class 8.—Lumber:	
A. S. Carman	6,169.50
Class 8—Continued.	
F. W. Kreeling & Sons*	$5,505.00
William Walker	6,791.25
Abraham Powell	6,254.50
Class 9.—Tools:	
Miller, Sloss & Scott	242.50
Pacific Tool and Supply Co.*	205.53
Harry L. Briggs	219.12
S. C. Forsaith Machine Co	233.78
Dunham, Carrigan & Hayden Co	243.15
Class 10.—Metals:	
Bradford, Kennedy Sons & McGuire	1,576.12
Miller, Sloss & Scott	1,673.12
S. C. Forsaith Machine Co	1,750.45
Dunham, Carrigan & Hayden Co.*	1,504.98
Class 11.—Packing:	
Boston Woven Hose and Rubber Co.	237.00
Miller, Sloss & Scott	293.00
Dunham, Carrigan & Hayden Co.*	126.75
Class 12.—Paint:	
W. F. Whittier	550.85
Chas. M. Yates*	482.30
Chas. H. Pleasants	726.25
Class 13.—Pipe and fittings:	
Miller, Sloss & Scott	2,931.19
S. C. Forsaith Machine Co	2,734.01
Dunham, Carrigan & Hayden Co.*	2,719.07

* Accepted.

Proposals for supplies for New York navy-yard, under Bureau advertisement dated February 8, 1894; opened February 27, 1894.

Class 1.—Brushes and brooms:	
Jacob Voelbel	$521.20
The Manhattan Supply Co	545.60
Jno. F. O. Wilkins	1,146.76
Jno. H. Tissot, jr.*	514.10
F. M. McWilliams	545.04
Class 2.—Portland cement:	
Bradford, Kennedy Sons & McGuire*	100.00
Porter's Sons & Co	136.50
Francis Harral	125.00
Atlas Cement Co	107.50
Class 3.—Charcoal:	
The Manhattan Supply Co.*	36.00
Chas. H. Pleasants	48.00
John McConnell	49.50
Imperial Pine Product Co	45.00
Class 4.—Hardware:	
H. H. Woodrough*	835.30
The Manhattan Supply Co	922.80
Eugene L. Maxwell	843.04
Jno. F. O. Wilkins	970.80
Wm. Porter's Sons	868.44
Jno. H. Tissot, jr.†	371.00
Porter's Son & Co	878.30
Francis Harral	885.40
Class 5.—White pine:	
Chas. E. Pell*	3,482.50
Export Lumber Co	3,745.00
S. C. Forsaith Machine Co	4,107.50
Watson & Pittinger	3,540.00
Class 6.—Poplar, white oak, etc.:	
Chas. E. Pell*	2,428.75
Export Lumber Co	3,037.50
Watson & Pittinger	2,430.00
Class 7.—Yellow pine:	
Chas. E. Pell	825.00
Wm. D. Wheelwright	675.00
Geo. L. Neville	1,025.00
Export Lumber Co.*	660.00
Watson & Pittinger	715.00
Class 8.—Glue, oil, etc:	
The Manhattan Supply Co	$210.82
Shoemaker & Busch	244.51
Chas. H. Pleasants*	193.61
F. M. McWilliams	264.00
Chas. M. Childs & Co	244.25
Class 9.—Files:	
The Manhattan Supply Co	132.30
Joseph E. Farrell	118.68
Jno. F. O. Wilkins	151.13
The J. Barton Smith Co	115.48
Jno. H. Tissot, jr	150.19
Freeman A. Godfrey	146.85
Woodruff, Mansfield & Co	110.26
Chas. F. Guyon	113.23
Porter's Son & Co	149.42
Class 10.—Waste:	
J. P. Newrath	359.50
The Manhattan Supply Co	385.00
Geo. L. Neville	450.00
Jno. F. O. Wilkins	285.00
Shoemaker & Busch	387.00
Thompson C. Gill & Co	399.50
Chas. H. Pleasants	374.50
Fiske Bros.*	349.00
John H. Tissot, jr	375.00
Freeman A. Godfrey	362.50
F. M. McWilliams	395.25
Class 11.—Electrical supplies:	
Page Bros. & Co.*	1,673.80
Wm. Porter's Sons	1,847.30
Porter's Son & Co	1,860.85
Class 12.—Electrical supplies:	
The General Electrical Co.*	4,814.33
Class 13.—Electrical supplies:	
The General Electrical Co.*	315.72
Class 14.—Electrical supplies:	
The General Electrical Co	896.15
Western Electric Co.*	869.75
Jno. H. Tissot, jr	1,229.46

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement February 7, 1894; opened March 6, 1894.

Class 1.—Hardware:	
The Manhattan Supply Co.*	$313.04
Class 2.—Oregon pine:	
Dunham, Carrigan & Hayden Co. ‡	318.56
Class 3.—Tools:	
The S. C. Forsaith Machine Co.*	98.90
Dunham, Carrigan & Hayden Co	106.69
Class 4.—Brass rod:	
The Manhattan Supply Co	40.00
Dunham, Carrigan & Hayden Co.*	38.00
Class 5.—Tool steel:	
Park Bro. & Co	229.50
Class 5—Continued.	
Dunham, Carrigan & Hayden Co	$334.00
Linden Steel Co.*	180.00
Class 6.—Rubber stoppers:	
The Manhattan Supply Co	158.00
A. F. Underwood §	129.50
Class 7.—Linseed oil, etc.:	
Dunham, Carrigan & Hayden Co.*	345.00
Class 8.—Ground cork:	
The Manhattan Supply Co	92.00
A. F. Underwood*	60.00
Class 9.—Varnish. ‡	

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated February 24, 1894; opened March 13, 1894.

Class 1.—Bunting:	
John A. Tissot, jr.,*	$4,203.35
N. Boynton & Co	4,252.50
Walter H. McDaniels	4,422.60
F. M. McWilliams	4,668.35
Class 2.—Ranges and kettles:	
Bramhall, Deane & Co.*	1,810.00
Class 2—Continued.	
Duparquet, Huot & Moneuse Co	$1,926.40
Class 3.—Shoes:	
John A. Tissot, jr	7,100.00
Cavanaugh & Thompson*	6,400.00
The Watsontown Boot & Shoe Co	7,200.00
Geo. F. Roedel	7,300.00

* Accepted. † Withdrawn. ‡ Open purchase. § Held up.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 29.—Tee steel:	
The Carnegie Steel Co.*	$106.18
Class 30.—Steel rivets:	
J. H. Sternbergh*	150.84
The Manhattan Supply Co	263.97
Frank H. Woodruff & Co	169.69
Thompson C. Gill & Co	150.84
Class 31.—Steel furnaces.†	
Class 32.—Brass tubes:	
A. P. Swoyer	1,376.20
Edward F. Keating	1,563.20
Class 32—Continued.	
The American Tube Works*	$1,376.20
The Manhattan Supply Co	1,376.20
Merchant & Co	1,376.20
S. C. Forsaith Machine Co	1,431.86
Class 33.—Copper plates:	
A. P. Swoyer	45.90
Merchant & Co.*	28.08
Class 34.—Grommets:	
The Vulcanized Fiber Co.*‡	34.50
The Manhattan Supply Co	34.50

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated November 11, 1894; opened November 28, 1893.

Class 1.—Molders' riddles:	
J. B. Kendall	$28.80
The Manhattan Supply Co	25.84
S. C. Forsaith Machine Co.*	24.96
Geo. L. Neville	26.00
Class 2.—American pig iron.	
J. W. Hoffmann	782.50
J. B. Kendall	775.00
The Manhattan Supply Co	747.50
S. C. Forsaith Machine Co.*	680.00
Class 2.—American pig iron—Continued.	
Thompson C. Gill & Co	$799.50
Geo. L. Neville	1,250.00
Class 3.—Princess pig iron:	
J. B. Kendall	165.00
S. C. Forsaith Machine Co.*	152.50
George L. Neville	400.00
Class 4.—2 Water tube boilers:	
Chas. Ward§	3,000.00
Chas. D. Mosher*	3,100.00

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated November 8, 1893; opened November 28, 1893.

Class 1.—Forgings:	
The Midvale Steel Co	$216.00
The Bethlehem Iron Co.*	187.20
G. J. Brown§	20.16
Class 2.—Forgings:	
The Midvale Steel Co.*	396.48
The Bethlehem Iron Co	481.44
G. J. Brown§	226.56
Class 3.—Boring machine.†	
Class 4.—Packing:	
The Manhattan Supply Co	200.25
Harry L. Briggs*	197.75
William Bowles	312.50
F. M. McWilliams	226.00
Class 5.—Tools:	
The Philadelphia Machinery and Supply Co	2,239.10
McFadden Co	2,140.63
The Manhattan Supply Co	2,220.97
Harry L. Briggs*	1,973.49
S. C. Forsaith Machine Co	2,277.72
A. P. Swoyer	2,220.92
Class 6.—Hardware:	
McFadden Co	134.72
The Manhattan Supply Co	138.19
Harry L. Briggs*	128.21
Class 7.—Potash, etc.:	
The Manhattan Supply Co	94.63
Chas. H. Pleasants*	80.42
Class 8.—Waste:	
Fiske Bros	418.30
McFadden Co	405.30
The Manhattan Supply Co	467.00
J. B. Kendall	449.45
William Bowles	653.00
Chas. H. Pleasants*	395.55
F. M. McWilliams	430.00
Class 9.—Lumber:	
Edwin A. Gaskill	963.50
Class 9—Continued.	
W. I. Gallaher	$984.00
W. T. & F. B. Weaver*	849.50
Church & Stephenson	1,110.00
Class 10.—Lacing:	
Page Belting Co	66.00
William Bowles	77.00
The Heim Belting Co.*	53.00
Class 11.—Muslin:	
McFadden Co	18.90
The Manhattan Supply Co.*	17.00
Harry L. Brigg	19.75
Chas. H. Pleasants	19.00
Class 12.—Tool steel:	
The Midvale Steel Co	840.00
Sanderson Bros. Steel Co	759.00
McFadden Co	977.70
J. B. Kendall	625.80
Park Bro. & Co., Limited§	
A. P. Swoyer	1,680.00
Cumberland Steel and Tin Plate Co.*	505.87
E. C. Brooks & Co	1,051.80
The Benjamin Atha & Illingworth Co	1,199.00
Class 13.—Steel:	
The Midvale Steel Co	376.70
J. B. Kendall*	207.18
Park Bro. Co., Limited	339.03
A. P. Swoyer	452.04
The Benjamin Atha & Illingworth Co	207.18
Class 14.—Files:	
G. & H. Barnett	2,157.78
The J. Barton Smith Co.*	2,016.34
Morton Reed & Co	2,197.22
Frank P. May & Co	2,136.64
McFadden Co	2,204.01
The Manhattan Supply Co	2,308.47
Harry L. Briggs	2,297.32

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated November 9, 1893; opened November 28, 1893.

Class 1.—15,000 yards trousers cloth:	
B. Y. Pippey & Co	$28,486.50
Wendell, Fay & Co	30,555.00
Sullivan Vail & Co	28,030.50
The Conshohocken Woolen Co.*	26,700.00
Class 2.—15,000 yards cloth for caps:	
B. Y. Pippey & Co	25,275.00
Wendell, Fay & Co	25,458.00
Sullivan Vail & Co.*	24,280.50
Class 3.—Mattresses, 2,000:	
Abraham Abraham	$5,880.00
Thomas M. Farley*	5,379.00
J. W. W. Moyer	5,440.00
Wm. F. Bernstein	5,487.80
Edwin F. Tilley	5,500.00
Louis Wechsler	5,850.00
Class 4.—4,000 mattress covers:	
John H. Tissot, jr	2,699.60

* Accepted. † Open purchase. ‡ By lot. § Informal.

Proposals for supplies for the navy-yard, Mare Island, Cal., etc.—Continued.

Class 4—Continued:	
A. S. Carman	$367.30
Class 5.—Fish plates:	
Miller, Sloss & Scott	410.00
Thompson C. Gill & Co.* †	223.20
Class 6.—Lumber:	
R. J. R. Aden	1,068.61
Abraham Powell	946.36
Wm. Walker*	907.54
A. S. Carman	926.63
Class 7.—Piles:	
R. J. R. Aden	4,140.00
Abraham Powell	3,565.00
Wm. Walker	3,622.50
A. S. Carman*	3,562.70
Class 8.—Steel rails: ‡	
Miller, Sloss & Scott	2,427.25
Class 8—Continued:	
S. C. Forsaith Machine Co	$2,663.04
Class 9.—Spikes.	
Miller, Sloss & Scott	80.00
Thompson C. Gill & Co	79.80
S. C. Forsaith Machine Co.*	78.00
Class 10.—Iron:	
Miller, Sloss & Scott	281.13
Dunham, Carrigan & Hayden Co*	232.38
Thompson C. Gill & Co	395.63
The Carnegie Steel Co	340.08
Class 11.—Terra-cotta pipe:	
Miller, Sloss & Scott*	102.00
R. J. R. Aden	132.00
A. S. Carman	120.00

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated March 6, 1894; opened March 22, 1894.

Class 1:	
A. S. Spandour:*	
Fixed price for wells 50 feet deep	$28.50
Uniform price for every additional foot	.57
S. C. Forsaith Machine Co.:	
Fixed price for wells 50 feet deep	125.00
Uniform price for every additional foot	2.15
Geo. A. Wilkins:	
Fixed price for wells 50 feet deep	39.45
Uniform price for every additional foot	1.12
Class 2.—Pipe and fittings:	
Cuyler & Mohler	705.16
Henry Walke	643.40
S. C. Forsaith Machine Co	655.31
Manhattan Supply Co.*	571.53
Edward F. Keating	668.52
J. W. Gaskill	691.47
Class 2—Continued:	
Donegan & Swift	$634.20
E. T. Tweedy	736.45
Reuter & Mallory	762.79
Colwell Lead Co	661.96
E. V. White & Co	673.63
Geo. L. Neville	619.95
Class 3.—Valves:	
Cuyler & Mohler	102.00
Henry Walke	83.00
S. C. Forsaith Machine Co	154.16
Manhattan Supply Co	59.40
J. W. Gaskill	59.13
Donegan & Swift	80.00
E. T. Tweedy	104.60
Reuter & Mallory	69.72
Colwell Lead Co	61.50
F. V. White & Co	384.70
Geo. L. Neville*	55.90

Proposals for supplies for the navy-yard, New York, under Bureau advertisement dated March 8, 1894; opened March 27, 1894.

Class 1.—Brushes:	
J. H. Chesley & Co	$189.90
Jno. J. Wheelan	208.61
The Manhattan Supply Co.*	154.95
Clifford Pemberton	200.52
F. M. McWilliams	179.05
Shoemaker & Busch	176.90
Geo. L. Neville	338.00
Francis Harral	173.40
Jno. H. Tissot, jr	160.80
Class 2.—Paints:	
Charles M. Childs & Co	227.00
The Manhattan Supply Co	206.00
Clifford Pemberton	208.87
Shoemaker & Busch	228.05
Fiske Bros.*	190.50
Class 3.—Pipe fittings:	
H. H. Woodrough	160.48
The Manhattan Supply Co	144.27
E. T. Tweedy*	132.55
Edward F. Keating	143.59
Geo. L. Neville	146.30
Morse Burtis	138.76
Chas. Millar & Son	154.70
S. C. Forsaith Machine Co	144.16
Class 4.—Cocks and valves:	
H. H. Woodrough	143.71
The Manhattan Supply Co	141.80
E. T. Tweedy	147.45
Edward F. Keating	147.19
Geo. L. Neville	155.00
Morse Burtis	148.55
Chas. Millar & Son	165.00
S. C. Forsaith Machine Co	138.30
Class 5.—Pipe:	
James Clendenin	114.08
The Manhattan Supply Co	114.08
Class 5—Continued:	
Edward F. Keating* §	$114.08
Geo. L. Neville	125.00
Morse Burtis	114.08
Chas. Millar & Son	120.94
Class 6.—Tools:*	
J. H. Chesley & Co	577.15
Sam'l W. Cornell	565.60
H. H. Woodrough*	486.74
The Manhattan Supply Co	515.35
Francis Harral	514.44
Jno. H. Tissot, jr	584.23
Bradford, Kennedy Sons & McGuire	520.58
Class 7.—Alcohol:	
Shoemaker & Busch*	224.00
Class 8.—3 sets china ware, flag officer:	
James M. Shaw & Co.*	378.00
Class 9.—12 sets china ware, captains:	
James M. Shaw & Co.*	1,249.32
Class 10.—W. R. china ware, *Boston:*	
John E. Frymier‖	134.82
Class 11.—For *Iowa:*	
John E. Frymier¶	179.68
Class 12.—For *Amphitrite:*	
Jno. E. Frymier**	130.34
Class 13.—For *Indiana:*	
Jno. E. Frymier**	174.20
Class 14.—For *Massachusetts:*	
Jno. E. Frymier**	174.20
Class 15.—For *Maine:*	
Jno. E. Frymier**	185.16
Class 16.—For *Minneapolis:*	
Jno. E. Frymier**	185.16
Class 17.—For *Texas:*	
Jno. E. Frymier**	185.16

* Accepted. † Canceled, readvertised. ‡ No award, bids excessive; readvertised.
§ By lot. ‖ Open purchase. ¶ Readvertised to open May 1, 1894.
** Readvertised.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 18.—For *Oregon:*	
Jno. E. Frymier *	$174.20
Class 19.—For *Olympia:*	
Jno. E. Frymier †	174.20
Class 20.—For *Cincinnati:*	
Jno. E. Frymier †	140.30
Class 21.—For *Castine:*	
Jno. E. Frymier †	118.38
Class 22.—For *Brooklyn:*	
Jno. E. Frymier *	196.12
Class 23.—For *Raleigh:*	
Jno. E. Frymier †	140.30
Class 24.—For *Monadnock:*	
Jno. E. Frymier *	$129.34
Class 25.—For *Terror:*	
Jno. E. Frymier *	129.34
Class 26.—For *Montgomery:*	
Jno. E. Frymier †	129.34
Class 27.—For *Puritan:*	
Jno. E. Frymier *	129.34
Class 28.—Lamps:	
The Manhattan Supply Co	1,627.58
Manhattan Brass Co	1,572.34
Wm. Porter's Sons ‡	1,553.42
Porter's Son & Co	1,662.35

Proposals for supplies for the naval station, Port Royal, S. C., under Bureau advertisement dated March 9, 1894; opened April 3, 1894.

Class 1.—Creosoted lumber:	
The Fernandina Oil and Creosote Works ‡	$8,508.68
George L. Neville	11,071.20
Class 2.—Yellow pine:	
J. J. Cummings ‡	541.01
George L. Neville	632.89
Class 3.—Bituminous coal. †	
Class 4.—Broken stone:	
The Brandywine Granite Co	2,600.00
James Symington	2,190.00
Stewart Stone Co	2,390.00
Chas. G. Smith & Son ‡	2,130.00
Geo. L. Neville	2,200.00
Class 5.—Hardware:	
J. H. Chesley & Co. ‡	84.63
Ira B. White	103.25
Eugene L. Maxwell	139.14
Geo. L. Neville	163.40
Class 6.—Copper sheathing:	
Merchant & Co	201.60
J. H. Chesley & Co	202.90
Ira B. White	224.64
James Clendenin ‡ §	201.60
Park Bro. & Co	201.60
The S. C. Forsaith Machine Co	227.52
J. Freidenstein	201.60
Chas. H. Pleasants	295.05
New Bedford Copper Co	201.60
Wm. J. Braker	230.40
Thompson C. Gill & Co	230.25
Geo. L. Neville	221.76
Class 7.—I beams:	
Ira B. White ‡	$127.20
Class 8.—Blocks, etc.:	
Eugene L. Maxwell ‡	46.61
Geo. L. Neville	99.00
Class 9.—Manila rope:	
F. M. McWilliams ‡	35.36
J. H. Chesley & Co	37.54
Ira B. White	37.74
The S. C. Forsaith Machine Co	39.42
Chas. H. Pleasants	42.94
Eugene L. Maxwell	38.22
Thompson C. Gill & Co	38.17
Geo. L. Neville	42.44
Class 10.—Bolts and washers:	
J. H. Chesley & Co	207.50
Ira B. White	169.15
H. Sternbergh	188.21
Eugene L. Maxwell	203.24
Thompson C. Gill & Co. ‡	163.61
Geo. L. Neville	365.20
Class 11.—Tools:	
Ira B. White	41.50
The S. C. Forsaith Machine Co	36.54
Eugene L. Maxwell ‡	35.64
Thompson C. Gill & Co	63.86
Geo. L. Neville	50.00
Class 12.—Cast iron for hammer:	
Thompson C. Gill & Co. ‡	89.70
Geo. L. Neville	180.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement, dated March 16, 1894; opened April 10, 1894.

Class 1.—Five steam pumps:	
Geo. F. Blake Manufacturing Co	$1,990.00
Geo. E. Dow ‡	1,500.00
Miller, Sloss & Scott	1,992.50

Proposals for supplies for the navy-yard, Washington, D. C., and naval proving ground Indian Head, Maryland.

Class 1.—Portland cement:	
Arthur C. Babson	$174.00
Clark Bros	158.40
S. W. Niemeyer	176.40
Geo. L. Neville	210.00
W. T. & F. B. Weaver	210.00
Atlas Cement Co. ‡	152.40
J. T. Walker & Sons	162.00
F. M. McWilliams	222.00
Class 2.—Window sash:	
S. W. Niemeyer	46.20
Geo. L. Neville	96.00
W. T. & F. B. Weaver ‡	23.40
J. T. Walker & Sons	25.80
James H. Shindler	36.00
Class 3.—Steel nails:	
Thompson C. Gill & Co	29.82
J. H. Chesley & Co	25.60
W. A. Pate	26.60
S. W. Niemeyer	103.60
Class 3—Continued:	
Geo. L. Neville	$32.00
Manhattan Supply Co	36.50
W. T. & F. B. Weaver	23.95
J. T. Walker & Sons ‡	28.20
F. M. McWilliams	43.75
Class 4.—Roofing tin:	
Thomson C. Gill & Co	158.26
J. H. Chesley & Co. ‡	146.76
S. W. Niemeyer	221.60
Geo. L. Neville	221.60
Manhattan Supply Co	232.60
W. T. & F. B. Weaver	155.30
J. T. Walker & Sons	170.00
F. M. McWilliams	235.00
Class 5.—Georgia pine:	
Church & Stevenson ‡	439.50
Geo. L. Neville	411.90
W. T. & F. B. Weaver	487.89
James H. Shindler	411.90

* Readvertised. † Open purchase. ‡ Accepted. § Tie bid

Proposals for supplies for the navy-yard, Washington, D. C., etc.—Continued.

Class 6.—White pine:	
Church & Stephenson *	$143.01
Geo. L. Neville	225.62
W. T. & F. B. Weaver	253.19
James H. Shindler	160.57
Class 7.—Sewer pipe:	
Thompson C. Gill & Co	64.80
Clark Bros	51.60
J. H. Chesley & Co.*	40.25
W. A. Pate	40.80
S. W. Niemeyer	72.80
Geo. L. Neville	66.00
Manhattan Supply Co	72.00
J. T. Walker & Sons	52.00
Class 8.—Steel forging:	
The Bethlehem Iron Co.*	$70.47
Class 9.—Serge, cartridge cloth:	
Elliot B. Thurber	14,598.54
N. L. Phipps	14,089.50
J. H. Chesley & Co	11,723.07
Henry T. Kent	15,756.00
Manhattan Supply Co	14,686.41
Jno. H. Tissot, jr.*	10,726.20
F. M. McWilliams	13,975.87
Jno. B. Daish	12,856.29
Class 10.—Steam hammer:	
Bement, Miles & Co	2,970.00
Morgan Engineering Co.*	2,885.00

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated March 30, 1894; opened April 17, 1894.

Class 1.—1,500 gallons lubricating oil:	
Fiske Bros	$900.00
New York Lubricating Oil Co	675.00
Manhattan Oil Co.*	645.00
Class 2.—50,000 pounds red lead:	
F. W. Devoe & C. T. Reynolds Co.	2,735.00
Smith, Kline & French Co	2,625.00
Clifford Pemberton*	2,485.00
Geo. L. Neville	2,648.75
Class 3.—25,000 pounds white lead:	
F. W. Devoe & C. T. Reynolds Co	1,342.50
Smith, Kline & French Co	1,345.00
Clifford Pemberton*	1,242.50
Geo. L. Neville	1,324.37
Class 4.—20,000 pounds white zinc:	
The Taylor Paint and Oil Co.*	994.00
F. W. Devoe & C. T. Reynolds Co	1,140.00
Smith, Kline & French Co	1,100.00
Chas. H. Bergmann	1,010.00
Chas. M. Childs & Co	1,116.00
Clifford Pemberton	1,094.00
George L. Neville	1,118.00
Class 5.—Iron pipe:	
Thompson C. Gill & Co	1,342.00
Morse Burtis*	856.25
The Manhattan Supply Co	1,022.00
S. C. Forsaith Machine Co	976.10
Edward F. Keating	861.50
Eugene L. Maxwell	944.60
Pancoast & Rogers	880.40
E. T. Tweedy†	854.46
Class 6.—Seamless brass pipe:	
A. P. Swoyer & Co.*‡	965.52
Merchant & Co	965.52
The Manhattan Supply Co	1,000.78
The American Tube Works	965.52
S. C. Forsaith Machine Co	992.67
Edward F. Keating	1,009.80
Geo. H. Clowes	965.52
Eugene L. Maxwell	1,010.17
Class 6—Continued.	
James Clendenin	$1,022.83
Class 7.—Pipe fittings:	
Morse Burtis	242.70
The Manhattan Supply Co	278.10
S. C. Forsaith Machine Co	266.59
Edward F. Keating*	222.01
E. T. Tweedy	254.00
Class 8.—Lavatories:	
Geo. F. Bishop*	540.00
Class 9.—Fire clay:§	
Thompson C. Gill & Co	14.94
The Manhattan Supply Co	13.20
Chas. H. Pleasants	20.94
Brooklyn Fire Brick Works	9.60
Class 10.—Files:	
Thompson C. Gill & Co	35.94
Morse Burtis	21.00
The Manhattan Supply Co	22.38
Chas. H. Pleasants	29.04
Eugene L. Maxwell*	19.56
Class 11.—Borax:	
Fiske Bros	28.50
Thompson C. Gill & Co	34.25
The Manhattan Supply Co	36.40
Smith, Kline & French*	24.37
Chas. H. Pleasants	26.22
Eugene L. Maxwell	26.75
Class 12.—Rivets:	
The Manhattan Supply Co	47.00
Eugene L. Maxwell	60.25
Brooklyn Hardware and Sporting Goods	49.75
Class 13.—Candles:	
Thompson C. Gill & Co	105.00
The Manhattan Supply Co	114.00
Manhattan Oil Co	87.50
Chas. H. Pleasants*	80.50
H. Warner Ells	96.25

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated March 29, 1894; opened April 24, 1894.

Class 1.—30,000 pounds wheat flour:	
Thos. H. Dowling*	$690.00
Class 2.—2,000 gallons beans:	
Jacob Levi, jr.*	527.50
Joseph Ehrman	600.00
Thos. H. Dowling	615.00
Class 3.—1,200 gallons pease:‖	
Jacob Levi, jr	398.40
Joseph Ehrman	420.00
Thos. H. Dowling†	343.40
Class 4.—7,000 pounds rice:	
Jones & Co	320.60
Jacob Levi, jr.*	308.00
Joseph Ehrman	315.00
Thos. H. Dowling	345.00
Class 5.—1,500 pounds dried apples:	
Jones & Co	165.00
Jacob Levi, jr.*	150.00
Joseph Ehrman	315.00
Thos. H. Dowling	345.00
Class 6.—1,500 pounds dried peaches:	
Jones & Co.*	$176.25
Jacob Levi, jr	187.50
Joseph Ehrman	247.50
Thos. H. Dowling	300.00
Class 7.—150 pounds dried raisins:‖	
Jones & Co	9.00
Jacob Levi, jr	8.25
Joseph Ehrman	10.50
Class 8.—750 pounds dried currants:	
Jones & Co	45.00
Jacob Levi, jr.*	33.75
Joseph Ehrman	63.75
Thos. H. Dowling	48.75
Class 9.—750 pounds dried prunes:	
Jones & Co.*‡	56.25
Jacob Levi, jr	56.25
Joseph Ehrman	71.25
Thos. H. Dowling	82.50

* Accepted. † Withdrawn. ‡ Tie bid. § No award. ‖ Open purchase.

Proposals for supplies for the navy-yard, Mare Island, Cal., etc.—Continued.

Class 10.—7,000 pounds tomatoes:	
Jones & Co.*	$244.30
Jacob Levi, jr	255.50
Joseph Ehrman	280.00
Thos. H. Dowling	315.00
Class 11.—1,000 pounds tea.	
Jones & Co	238.75
Jacob Levi, jr	297.50
Joseph Ehrman	330.00
Thos. H. Dowling*	230.00
Class 12.—25,000 pounds sugar:	
Jones & Co	1,462.50
Jacob Levi, jr.*	1,365.00
Joseph Ehrman	1,367.50
Class 13.—1,500 gallons sirup:	
Jones & Co	322.50
Jacob Levi, jr.*	236.25
Joseph Ehrman	300.00
Class 13—Continued.	
Thos H. Dowling	$285.00
Class 14.—1,000 gallons vinegar:	
Jones & Co	150.00
Jacob Levi, jr	105.00
Joseph Ehrman	125.00
Thos. H. Dowling*	90.00
Class 15.—Steel rails:	
Thompson C. Gill & Co	1,683.61
Dunham, Carrigan & Hayden Co.*	1,203.42
S. C. Forsaith Machine Co	1,737.57
Miller, Sloss & Scott	1,911.67
Bethlehem Iron Co	1,428.00
Class 16.—Steel angle plates:	
Thompson C. Gill & Co	214.14
Dunham, Carrigan & Hayden Co.*	120.40
S. C. Forsaith Machine Co	229.62
Miller, Sloss & Scott	227.04

Proposals for supplies for the navy-yard, Washington, D. C., under Bureau advertisement dated April 12, 1894; opened May 1, 1894.

Class 1.—Petroleum oil:	
William Bowles	$720.00
Bosshardt & Wilson Co	216.00
Tough, Rutherford & Co	664.00
N. J. Rose, Son & Co	464.00
Charles Becker	160.00
Standard Oil Co.*	120.00
Class 2.—Lard oil:	
William Bowles	272.00
Bosshardt & Wilson Co	256.00
Manhattan Oil Co	236.00
Tough, Rutherford & Co	250.00
George Ryneal, jr	244.00
N. J. Rose, Son & Co	280.00
Chas. Becker	242.00
Standard Oil Co.*	221.60
Fiske Bros	243.60
Class 3.—Paraffin oil:	
William Bowles	440.00
Bosshardt & Wilson Co	360.00
Manhattan Oil Co	300.00
Tough, Rutherford & Co	300.00
N. J. Rose, Son & Co	345.00
Charles Becker	255.00
Standard Oil Co	224.40
Fiske Bros*	222.00
Class 4.—Rape-seed oil.	
William Bowles	150.00
Bosshardt & Wilson Co	124.00
Manhattan Oil Co.*	1,152.00
Tough, Rutherford & Co	138.00
Geo. Ryneal, jr	133.00
N. J. Rose, Son & Co	130.00
Charles Becker	130.00
Chas. M. Childs & Co	125.00
Standard Oil Co	118.00
Fiske Bros	118.00
Class 5.—Tools:	
Philadelphia Machinery and Supply Co.*	225.51
Class 5—Continued.	
John H. Tissot, jr	$229.47
S. C. Forsaith Machine Co	235.10
Francis Harral	235.80
Eugene L. Maxwell	235.04
Class 6.—Tool steel:	
Benjamin Atha & Illingworth Co.*	52.50
Thompson C. Gill & Co	69.90
J. B. Kendall	70.00
Park Bros. & Co., Limited	57.20
Cumberland Steel and Tin Plate Co.	63.75
Eugene L. Maxwell	82.00
Class 7.—Tools	344.08
The Manhattan Supply Co.*	181.82
S. C. Forsaith Machine Co	409.58
Francis Harral	410.20
Eugene L. Maxwell	330.12
Class 8.—Hardware:	
Philadelphia Machinery and Supply Co	19.57
The Manhattan Supply Co	28.85
John H. Tissot, jr	21.62
Francis Harral	19.68
Eugene L. Maxwell*	16.39
Class 9.—Files:	
Edward H. Mansfield*	193.86
Philadelphia Machinery and Supply Co	320.60
J. H. Chesley & Co	230.00
F. P. May & Co	219.80
Class 10.—Glycerin.	
Clifford Pemberton	387.00
The Manhattan Supply Co	407.70
Chas. H. Pleasants*	372.00
Chas. M. Childs	396.00
Smith, Kline & French Co	390.22
Z. D. Gilman	411.00
Eugene L. Maxwell	410.82
Fiske Bros	393.00

Proposals for supplies for the New York navy-yard under Bureau advertisement dated April 11, 1894; opened May 1, 1894.

Class 1.—Glassware, junior officers:	
Wm. F. Dorflinger	$36.36
James M. Shaw & Co.*	33.38
Class 2.—Glassware, warrant officers:	
Wm. F. Dorflinger	3.64
James M. Shaw & Co.*	3.24
Class 3.—Glassware, junior officers:	
Wm. F. Dorflinger	66.04
James M. Shaw & Co.*	60.36
Class 4.—Glassware, warrant officers:	
Wm. F. Dorflinger	7.28
James M. Shaw & Co.*	6.48
Class 5.—Chinaware, junior officers:	
J. Bradford Stevens	69.50
James M. Shaw & Co.*	64.88
Class 6.—Chinaware, warrant officers:	
J. Bradford Stevens*	$18.64
James M. Shaw & Co	21.22
John E. Frymier	20.66
Class 7.—Chinaware, junior officers.	
J. Bradford Stevens	125.92
James M. Shaw & Co.*	117.64
Class 8.—Chinaware, warrant officers.	
J. Bradford Stevens*	37.28
James M. Shaw & Co	42.44
John E. Frymier	41.32
Class 9.—Chinaware, ward room.	
The Royal Copenhagen Porcelain Co.*	143.80

* Accepted.

Proposals for supplies for the New York navy-yard, etc.—Continued.

Class 10.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	$103.29
Class 11.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	138.70
Class 12.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	138.70
Class 13.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	148.90
Class 14.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	148.90
Class 15.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	148.90
Class 16.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	138.70
Class 17.—Chinaware, ward room.	
The Royal Copenhagen Porcelain Co.*	159.10
Class 18.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	$103.29
Class 19.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	103.29
Class 20.—Chinaware, ward room:	
The Royal Copenhagen Porcelain Co.*	103.29
Class 21.—Chinaware:	
James M. Shaw & Co	230.14
John E. Frymier *	167.81
Class 22.—Glassware:	
Wm. F. Dorflinger	147.40
James M. Shaw & Co.*	133.60
Class 23.—Silver-plated ware:	
The Gorham Manufacturing Co	1,103.29
Wilcox Silver-plate Co.*	1,046.93
Class 24.—100,000 pounds salt water soap:	
Frank Morgan *	3,622.50
Manhattan Supply Co	3,710.00
John H. Tissot, jr	4,625.00
David S. Brown	3,680.00
Chas. J. McKeone	3,830.10

Proposals for supplies for the navy-yard, Boston, Mass., under Bureau advertisement dated April 26, 1894; opened May 15, 1894.

Class 1.—Galvanized steel wire: †	
S. C. Forsaith Machine Co	$3,033.32
The Western Electric Co	3,004.75
Washburn & Moen Manufacturing Co	2,813.85
Class 1—Continued.	
Geo. L. Neville	$3,187.25
The H. B. Newall Co	2,549.37
The Manhattan Supply Co	2,392.00

Proposals for supplies for the New York navy-yard, under Bureau advertisement dated April 28, 1894; opened May 15, 1894.

Class 1.—20,000 pound stinned mutton:	
C. J. Caughey *	$1,900.00
H. M. Anthony	3,330.00
Class 2.—5,000 pounds tinned brawn:	
L. H. Heyman	507.50
H. M. Anthony	512.50
Chas. E. Ahrens *	434.50
Class 3.—5,000 spoons:	
Wilcox Silver Plate Co.*	432.50
Brooklyn Hardware and Sporting Goods Co	469.00
Class 3—Continued.	
John F. O'Wilkins	$515.00
John H. Tissot, jr	492.00
Manhattan Supply Co	545.00
Class 4.—5,000 forks:	
Wilcox Silver Plate Co *	432.30
Brooklyn Hardware and Sporting Goods Co	469.00
John F. O'Wilkins	515.00
John H. Tissot, jr	492.00
Manhattan Supply Co	545.00

Proposals for supplies for the navy-yard, Mare Island, Cal., under Bureau advertisement dated April 27, 1894; opened May 22, 1894.

Class 1.—Steel plates:	
Miller, Sloss & Scott *	$396.26
Dunham, Carrigan & Hayden Co	482.72
Carbon Steel Co	549.37
Class 2.—Steel angles:	
Miller, Sloss & Scott	194.56
Dunham, Carrigan & Hayden Co.*	182.86
Class 3.—Steel rivet rods:	
Miller, Sloss & Scott *	135.70
Class 4.—Round iron:	
Miller, Sloss & Scott	240.50
Dunham, Carrigan & Hayden Co.*	181.35
Class 5.—White lead:	
F. M. Woods *	655.00
Chas. M. Childs & Co	862.50
Chas. M. Yates	718.75
Wm. P. Fuller & Co.—	
A	718.75
B	656.25
Class 6.—Red lead:	
F. M. Woods *	183.40
Chas. M. Childs & Co	241.50
Chas. M. Yates	192.50
Wm. P. Fuller & Co	192.50
Class 7.—White zinc:	
Valentine & Co	560.00
R. N Nason	525.00
Class 7—Continued.	
Chas. M. Childs & Co	$472.50
Chas. M. Yates	437.50
W. P. Fuller *	385.00
Class 8.—Alcohol:	
Wm. P. Fuller & Co.*	414.00
Class 9.—Varnishes:	
Valentine & Co.*	521.50
R. N. Nason	673.25
Chas. M. Childs & Co	622.50
Chas. M. Yates	618.00
Wm. P. Fuller & Co	625.75
Class 10.—Linseed oil:	
R. N. Nason	332.50
Chas. M. Childs & Co.*	302.74
Chas. M. Yates	305.00
Wm. P. Fuller & Co	317.50
Class 11.—Turpentine:	
R. N. Nason	87.50
Chas. M. Childs & Co	105.00
Chas. M. Yates	78.75
Wm. P. Fuller & Co.*	75.25
Class 12.—Paints:	
Valentine & Co	183.50
R. N. Nason	205.73
Chas. M. Childs & Co	(†)
Chas. M. Yates	192.78
Wm. P. Fuller & Co.*	163.55

* Accepted. No award; readvertised June 5, 1894. † Informal.

Proposals for supplies for the navy-yard, Mare Island, Cal., etc.—Continued.

Class 13.—Brushes:	
Nelms & Co.*	$405.09
R. N. Nason	624.09
Chas. M. Yates	507.94
Class 14.—Lumber:	
Abraham Powell	2,426.80
W. H. Leahy*	2,168.85
Wm. Walker	2,391.23
A. S. Carman	2,463.50
Class 15.—Oars:	
Abraham Powell	252.50
Sam'l F. Weeks*	227.25
Wm. Walker	353.50
A. S. Carman	265.12
Class 16.—Tools:	
Francis Harral*	1,056.29
Miller, Sloss & Scott	1,189.52
Dunham, Carrigan & Hayden Co	1,177.88
F. W. Wright	1,279.42
Class 17.—Hardware:	
Francis Harral*	229.00
Miller, Sloss & Scott	236.35
Dunham, Carrigan & Hayden Co	239.90
F. W. Wright	232.81
Class 18.—Pipe staves:	
Abraham Powell*	70.80
W. H. Leahy	84.00
Miller, Sloss & Scott	78.00
A. S. Carman	72.00
Class 18—Continued.	
F. W. Wright	$90.00
Class 19.—Rubber:	
Boston Woven Hose and Rubber Co.	656.75
W. J. Graham	935.50
Bowers Rubber Co.*	544.30
Class 20.—Oakum:	
Samuel F. Weeks	264.00
C. J. Kendrys Son & Co	264.00
Dunham, Carrigan & Hayden Co.*	247.50
Class 21.—Pipe:	
Miller, Sloss & Scott	399.36
Dunham, Carrigan & Hayden Co.*	355.20
Class 22.—Basins and bath tubs.†	
Class 23.—Bolts, nuts, and rivets:	
Miller, Sloss & Scott	301.21
F. W. Wright*	287.74
Class 24.—Sheet brass:	
Miller, Sloss & Scott	62.64
Dunham, Carrigan & Hayden Co.*	51.98
Class 25.—Pipe and fittings:	
Miller, Sloss & Scott	148.61
Dunham, Carrigan & Hayden Co.*	133.63
L. M. Kellogg	156.84
Class 26.—Whiting, etc.:	
R. N. Nason	(‡)
Chas M. Childs & Co	129.60
Chas. M. Yates*	81.26
Wm. P. Fuller & Co	89.25

Proposals for supplies for the navy-yard, Norfolk, Va., under Bureau advertisement dated May 11, 1894; opened May 29, 1894.

Class 1.—Corrugated iron, etc.:	
Geo. L. Neville	$2,946.90
Colwell Lead Co	3,178.47
S. C. Forsaith Machine Co	2,292.09
Thompson C. Gill & Co	2,380.83
Class 1.—Continued.	
Milliken Bros	$2,713.33
McDaniel & Harvey Co	2,054.47
Merchant Co	2,121.90
N. B. Handy & Co.*	2,040.18

* Accepted. † Open purchase. ‡ Informal.

REPORT

OF

THE SURGEON-GENERAL

U. S. NAVY.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., October 1, 1894.

SIR: In obedience to instructions contained in Department's letter of July 2, 1894, I have the honor to report the operations of this Bureau for the last fiscal year, accompanied by duplicate set of annual estimates for the fiscal year ending June 30, 1896, and statistical report showing the health of the Navy for the year 1893. The report embraces a statement of the condition of the naval hospital fund, the naval medical establishment, and other matters of interest pertaining to the duties of the Bureau of Medicine and Surgery.

NAVAL HOSPITAL FUND.

The condition of this fund is as follows:

Balance on hand July 1, 1893	$313,925.81
Transferred to the credit since July 1, 1893	105,813.32
	419,739.13
Expended since July 1, 1893	110,393.85
Balance on hand June 30, 1894	309,345.28

By an act approved July 2, 1890, Congress authorized the Secretary of the Navy to sell to the city of Brooklyn a certain portion of land belonging to the naval hospital ground, and directed that the sum received from such sale be paid into the Treasury for the benefit of the naval hospital fund.

From the sale of said hospital land the sum of $95,048.78 was placed, by appropriation warrant dated February 18, 1892, to the credit of the naval hospital fund.

By an act approved July 26, 1894, authority was given to use, in all, $69,000 from the sum accruing from said sale for complete renovation, etc., of present hospital building, erection of retaining and boundary wall, new kitchen, mess hall, and additional ward.

NAVAL HOSPITALS.

Naval hospital, Portsmouth, N. H.—The sewer has been extended across the beach, and good drainage is now secured. Floors and stairways of first and second stories have been renovated. It is recommended that a piece of ground south of the building, about one acre in extent, be transferred to the hospital and used as a garden. A small

house for storage of tools, paints, oils, etc., should be constructed. There is also great need of a building to be used as a pest house, for in the event of an outbreak of smallpox, or other highly contagious disease, there would be no building available to which such cases could be transferred.

Naval hospital, Chelsea, Mass.—On interior of building, lead and oil paint has been substituted for calcimine. The wards, even in severest weather, are kept comfortable by steam heat; water supply, though sufficient in quantity, is so impure, from presence of organic matter, that a sterilizing apparatus is necessary; grounds and outbuildings are in good order; pest house has been replastered and painted, and the heating of its annex improved by the introduction of a drum; sewers have been flushed and disinfected; and an electric-light plant is being installed.

Naval hospital, Brooklyn, N. Y.—Electric lights have been introduced into buildings and grounds; kosmocrete pavements have been laid from gate to northwest angle of hospital, also in basement corridors and kitchen. Four standing water pipes, for protection against fire, have been put in, and extend from basement to attic. Repairs to roof, floors, and ceilings in main building, annex, chapel, and laundry have been made; closets, steam, water, and drain pipes have been overhauled; grounds are in good order.

Naval hospital, Philadelphia, Pa.—Hot water and steam boilers repaired; engine house and laundry repaired and painted; boiled water, cooled, is now used for drinking. A dead room has been fitted up in the old stone building back of hospital. The outside of the hospital, including roof, has been repaired and painted, and inside painted; the basement has been whitewashed. The plumbing system needs renovation. Substitution of electric light for gas is recommended.

Naval hospital, Washington, D. C.—The electric light has been introduced. Granolithic pavement has been laid in basement.

Naval hospital, Norfolk, Va.—Walls and ceilings scraped and floors painted. Grounds and inclosures are in good order. A portion of the hospital is lighted by electricity. Some of the boilers need repairs. The driven wells give a good supply of water. The outbuildings are in fair condition. A new wharf is needed.

Naval hospital, Pensacola, Fla.—With the exception of renovating the brick cistern, no repairs have been made at this hospital.

Naval hospital, Mare Island, Cal.—Obsolete closets have been removed and replaced by those of the siphon pattern. The cells have been transferred from garret to basement. Sewers have been repaired. The improvements on steam-heating apparatus are almost completed.

Naval hospital, Yokohama, Japan.—Buildings, grounds, and equipment are in good condition. The detached ward has been repaired and painted. The covering of the rear verandah of lower ward has been replaced by a plaster and tiled wall, the windows of which are protected by iron shutters. An iron fence has been erected along the front of grounds.

A tank or cistern for storage of rain water is much needed.

SPECIAL HOSPITAL NOTES.

New York.—Thirty-three cases of acute pneumonia were admitted during the year, and of this number 31 recovered and returned to duty. The average age of these men was 24 years. The rate of mortality was very low, and the number of recoveries correspondingly large.

The method of treatment adopted is believed to be largely responsible for the result attained, and consisted in the hypodermic use of sulphate of strychnia, $\frac{1}{25}$ to $\frac{1}{30}$ of a grain, repeated every three or four hours, according to the severity of the disease, and liberal doses of alcoholic stimulants.

Norfolk, Va.—Cases of typhoid fever have been treated by Brandt's method with satisfactory results. A laparotomy for gunshot wound of abdomen, cutting the intestines in five places, was performed.

NAVY-YARDS.

Navy-yard, Portsmouth, N. H.—The general health of the station has been good. A rather severe form of influenza prevailed during the latter part of the year, attacking families chiefly.

From the average force of 121 officers and men there have been 168 admissions and 797 sick days. Two deaths occurred, both being the result of accidental injuries.

A new brick washhouse has been erected at the marine barracks. This building contains bath tubs and water-closets with modern improvements. It is recommended that a cemetery be established on the low ground at the southeast part of Seaveys Island, there being no room for additional graves in the old cemetery.

Navy-yard, Boston, Mass.—The sanitary condition of the yard remains good, with the exception of the building in which the dispensary and pay office are situated.

The health of the yard community remains good.

One case of scarlatina occurred in the marine barracks. The plumbing of the marine barracks, after overhauling, is now in good condition.

The exercise ground of the naval prison has been enlarged to twice its former size, but the walls of the inclosure are too high, cutting off all breeze, so that in hot weather the men are compelled to exercise in the prison corridors.

The water supply, now drawn from the Mystic ponds, is slowly but steadily deteriorating in quality, owing to increase in number of residences and manufacturing establishments near source of supply. Owing to this fact the question of a pure water supply for the yard will soon be an important one. Attention is called to the propriety of utilizing the large cisterns in the yard for collection and storage of water for drinking purposes. The Mystic water is also unsuited for manufacturing purposes, owing to deposits from it in the boilers.

The vehicle used as an ambulance is totally unsuited for the purpose, from the fact that a stretcher can not be placed in it. When a workman is so badly injured as to necessitate the use of a stretcher a call has to be made for the police ambulance.

Navy-yard, New York.—The number of officers attached to the yard has averaged 73. There have been 60 admissions to the list, giving 426 sick days. One death, a lieutenant, occurred from pulmonary hemorrhage. An unusually large number of cases of bronchial catarrh and throat affections have prevailed, believed to be due to climatic conditions. The daily average number of mechanics and other employés has been 2,000. First aid to the sick and injured has been rendered to 172 of this class.

A small brick furnace has recently been utilized for burning garbage and refuse, and a larger one especially designed for this purpose could be used to advantage.

Marine barracks: Average strength of post, 205. One hundred and

sixty-eight were admitted during the year, all of whom recovered except one, who was discharged from service by medical survey,

Enlistments for the Marine Corps: Examined, 97; accepted, 45; rejected, 52. The comparatively large number accepted is explained by the fact that many of the men were for reenlistment.

Navy-yard, League Island, Pa.—Average complement of officers, men, and employés has been 275. There were 117 admissions to sick list, giving 542 sick days, with 1 death.

Rain water is used exclusively for drinking and culinary purposes, but as the supply from this source is limited, a distilling apparatus of sufficient capacity should be constructed, or connection made with the water supply of the city. The water from the river and the well, at the marine barracks is unfit for use.

The drainage of the yard has been somewhat improved by laying a 12-inch pipe from near the back channel to the Delaware. This is flushed at times to prevent clogging. Small drainpipes have been laid in other places to carry off surface water. A good system of drains and sewers is much needed.

The marine barracks have the back channel on the south and on the north and east deep ditches filled with water. The shores of the back channel are littered with débris deposited by the tide; into this channel also flows the refuse from many buildings.

The accommodations at the barracks are not sufficient for the number of men stationed there.

Navy-yard, Washington, D. C.—There were 172 admissions to the sick list; of these 129 returned to duty, 42 were transferred to hospital, and 1 died. Total number of sick days was 699. Fifty-three cases of injury among workmen in the yard received attention.

Among the marines diarrhœa prevailed during the summer and malarial fevers during the autumn. The diarrhœa was probably due to the use of unfiltered drinking water. Two cases of typho-malarial fever terminated fatally in the hospital. One fatal case of diphtheria, child of an officer, occurred.

Prior to September, 1893, the Sixth street sewer, which drains a large section of the city, and bounds the western limit of the yard, was in a most unsanitary condition at its terminus. The sewage was emptied upon dense vegetation, and the feeble tide did not dislodge it, but rather served to spread it upon the low water front of the yard. This state of affairs has been somewhat improved by widening and deepening the channel toward the main channel. This work was done at the expense of the yard. The city authorities, who have been made aware of this condition of affairs, should give the matter prompt and thorough attention.

Navy-yard, Norfolk, Va.—During 1893 there were 149 admissions; 115 were discharged to duty, 2 died, 30 were transferred to hospital, and 2 remained on the list at the end of the year. The number of sick days was 827. The complement was 125.

A general revaccination of marines was practiced during the latter part of the year, and an unusually large number took among men who had been vaccinated at the time of enlistment. Influenza prevailed during December, many of the cases showing a tendency to relapse.

The marine prison is considered totally unfit for the purpose, being dark and very damp.

Some wells have been driven in the yard park, but the value of the water for drinking purposes has not yet been determined.

Medical aid was given to 169 mechanics, who received more or less

serious injuries, and probably double that number of trivial accidents were treated.

The dispensary should be nearer the shops, mills, and docks. A suitable room for examination of recruits is needed, and a separate building for the use of the medical department is recommended. A horse and ambulance, to be the property of the medical department of the yard, is much needed to transfer sick and injured enlisted men to the naval hospital, and injured workmen to their homes.

Navy-yard, Pensacola, Fla.—The admissions to the sick list numbered 8, giving 42 sick days. The officers, as a rule, occupy the second stories of the houses; this, in connection with the use of cistern water, has given immunity from malarial diseases.

The health of Warrington and Woolsey has been unusually good, and the past year has been free from epidemics, with the exception of a mild form of influenza.

Navy-yard, Mare Island, Cal.—An average force of 200 marines has been maintained. The total number of sick days was 804. Most of the admissions were due to accidents and venereal diseases.

Two Smead dry closets are being erected, one at the marine barracks and the other in the yard. The old sewer running down Central street is often offensive. It is recommended that a 6-inch iron pipe be run from this sewer into one of the chimneys of the blacksmith shop opposite.

NAVAL STATIONS.

Naval station, Newport, R. I.—Attention is again directed to the necessity of making more suitable provision for the accommodation of the sick on this station. The building now occupied for the treatment of the sick, and lacking in every convenience demanded by sanitary science, was originally constructed and used as a pest house for the care of pauper patients from the city of Newport.

The principal diseases and injuries treated during the year were as follows: Catarrhus epidemicus, rheumatismus, bronchitis, catarrhus, pneumonia, tonsillitis, abscessus, contusio, and stremma.

Naval station, New London, Conn.—No diseases of a contagious or epidemic character have prevailed. Attention has been paid to all points connected with sewerage and drainage.

Naval Academy, Annapolis, Md.—The number of admissions to the sick list were 526, with 2,027 sick-days, 2 transfers to hospital, and 1 death.

The average complement was 455, giving an average time on the list of each patient of 3.55 days.

Measles, chicken pox, scarlet fever (one case), mumps, and influenza prevailed to some extent.

The sanitary condition of the Academy would be benefited by improving the quality of the water supply, and by the installation of the electric light.

A small bacteriological plant and the addition of a laboratory and operating room to present sick quarters are recommended.

Naval proving ground, Indian Head, Md.—The health of the officers and employés has been good. The officers are quartered in houses which overlook the Potomac River. The heating and plumbing arrangements are good. Springs and wells supply drinking water of good quality.

Naval Station, Port Royal, S. C.—The health of the station has continued good. The water from the driven wells being of inferior quality, additional cisterns are being constructed.

The new marine barracks have been completed and are satisfactory.

RECEIVING SHIPS.

U. S. receiving ship Wabash.—A medical examining room has been constructed on the starboard side of the gun deck. This is well lighted by windows in the gun ports and heated by steam.

The greatest care is observed in watering the ship from shore to prevent sewage contamination. Substitution of electric lights for the present system is recommended. Record of enlistments for the year shows: Number examined, 891; accepted, 477; rejected, 414.

U. S. receiving ship Minnesota.—No contagious diseases have appeared during the year. Recruits examined for ship's company, 89; accepted, 77; rejected, 12. Apprentices examined, 1,642; accepted, 653; rejected, 989. Of apprentices accepted, 210, or 32 per cent, failed to enlist.

U. S. receiving ship Vermont.—During the month of December, catarrhus epidemicus developed among the recruits, 16 suffering from the disease; pneumonia was the most important complication; all recovered.

A few cases of varicella and rubeola developed during November and December, all ending in recovery.

The navy ration is not now issued; a caterer supplies all food used by recruits and ship's company; this arrangement has proved satisfactory.

The number of recruits examined was 1,677; accepted, 948; rejected, 729.

U. S. receiving ship St. Louis.—The number of recruits examined was 469; accepted, 266; rejected, 203. Number of apprentices examined, 178; accepted, 82; rejected, 96.

On the 18th of June last this ship was placed out of commission, and her place taken by the U. S. R. S. *Richmond.*

U. S. receiving ship Dale.—A mild form of influenza prevailed during the latter part of December. A marked increase of malarial diseases occurred, due to the formation of mud flats from the river dredgings.

The number of recruits examined was 332; accepted, 246; rejected, 86. Number of apprentices examined, 216; accepted, 92; rejected, 124. Number of marines examined, 67; accepted, 41; rejected, 26. Total number of persons examined, 615.

A room is much needed for the examination of recruits, and one should be constructed for the use of the medical officer on the spar deck, as it is quite impossible, in the place now devoted to the purpose, to make satisfactory examinations.

U. S. receiving ship Franklin.—Number of recruits examined, 401; accepted, 251; rejected, 150.

U. S. receiving ship Independence.—The number of recruits examined was 743; accepted, 574; rejected, 169.

RECRUITING.

The examination of recruits for the naval service is one of the most difficult and exacting duties to which medical officers can be assigned, and upon them devolves the responsibility of selecting the material on which the efficiency of our Navy depends. Moreover, every medical officer, when ordered on such duty, should be impressed with the importance of the work on which he is entering, and to which he should devote the utmost care and attention.

The conditions of life on board ship to-day are so radically different

from what they were a few years ago that far greater care is required in the selection of recruits.

Formerly, when vessels made long cruises under sail, and the men lived practically on deck in the open air, their physical condition, if below par at date of enlistment, would improve. Now, however, on board of our new ships, with complete change of environment, as well as the character of work demanded of them, recruits should be, as far as practicable, free from all physical imperfections.

Enlistments on seagoing ships should be prohibited by regulation, from the fact that many of our new ships are unprovided with suitable accommodations for such examination; some of them with no examining rooms or sick bays, and even in those having sick quarters, they are entirely inadequate for the proper performance of this work.

Conceding, therefore, the benefit that would accrue to the service if enlistments were conducted under more favorable conditions, it is suggested that the Department establish a central rendezvous on shore, preferably at the navy-yard, New York, for the examination of all recruits, suitably fitted up with all necessary appliances for the performance of this duty, well ventilated, lighted, and so situated as to be free from all disturbing influences.

In the course of a few years the Department would recognize an appreciable improvement in the general health of the Navy, as shown by a smaller annual percentage of sick on board of our ships, as well as a great reduction in the number of medical surveys upon men whose disabilities existed prior to their entry into the service, and who probably would not have been enlisted had their examination been made under more favorable circumstances.

U. S. NAVAL MUSEUM OF HYGIENE.

By order of the Secretary of the Navy, dated January 20, 1894, the old Naval Observatory buildings and grounds, situated at Twenty-third and E streets NW., were transferred to the Bureau of Medicine and Surgery, to be used by the Museum of Hygiene.

This transfer was requested, as the rented building was no longer adapted to the wants of the museum, on account of the large and increasing value of the exhibit and the necessity of having it properly grouped and classified for the purpose of study and observation; also to provide proper accommodations for the prosecution of microscopical and bacteriological investigations, which constitute an important feature in the administration of the museum.

In obedience to Department's order, the transfer of the exhibits was made on the expiration of the lease of the building, June 30, 1894, and necessary minor repairs were commenced as soon as the naval appropriation bill for 1895 was approved.

The large circular brick pier used for the small equatorial, obstructing hallway and light from dome, and piers for the mural circle and equal altitude have been removed; passage to the main building and great equatorial room enlarged; plumbing renewed; heating apparatus repaired and enlarged, and the several rooms assigned for special exhibits, chemical and bacteriological laboratories, microscopical room, photographic room, library, and offices.

The interest that has been manifested by the service and by professional and scientific bodies in the growth and development of a museum identified with the practical study and advancement of sanitary science is shown by the steady increase in the number of exhibits.

By the removal of the museum to commodious and permanent quarters the object of its organization can now be satisfactorily fulfilled, and opportunities offered for accomplishing good work in the future.

One hundred and ten new exhibits were added to the collection during the past year, including the complete and interesting "model of the system of disinfection practiced at the quarantine station at New Orleans." This model was exhibited at the Columbian Exposition at Chicago and presented to the museum by the Louisiana State board of health. Thirty specimens of animal parasites, contributed by the Department of Agriculture, have also been received, remounted, and labeled.

The following examinations have been made and reports in detail submitted:

(1) Pathological specimens of every nature and variety.
(2) Water from the Potomac, from Port Royal, S. C., and from several places in New England.
(3) Medicines, principally proprietary.
(4) Various specimens of coal from different sections of the country.
(5) Nine specimens of sandstone and granite, made at the request of the Bureau of Yards and Docks, to determine the fitness of the samples to be used in building dry docks.
(6) Sixty-one examinations (analyses) of the air, made in the Museum, during the inspection of the rooms occupied by the Navy Department in the State, War, and Navy Department building.

Important microscopical and bacteriological investigations have been made and other interesting hygienic work accomplished in answer to calls from other bureaus, from State boards of health, and from officials in all parts of the country.

The delegate recently appointed to represent the Medical Department of the Navy at the Eighth International Congress of Hygiene and Demography was directed to make a complete and thorough inspection of the museums of hygiene at London and Berlin, and report in detail, as follows:

(*a*) The general organization, equipment, and administration of the establishments visited, when founded, growth, and history.
(*b*) The nature, number, character, and general arrangement of all exhibits.
(*c*) Nature and extent of bacteriological, microscopical, and analytical work performed.
(*d*) Description, number, and price of exhibits that would be valuable additions to the Naval Museum of Hygiene, Washington, D. C.
(*e*) Complete catalogue of exhibits (if printed).
(*f*) System of cataloguing in libraries; nature and character of books, and how supplied.
(*g*) Complete catalogue of books (if printed).
(*h*) The scientific and commercial advantages resulting from the establishment of museums of hygiene
(*i*) Number of emyloyés and their duties.

Advantage will be taken of all valuable information thus obtained and efforts made to make the Naval Museum of Hygiene as complete in every arrangement and detail as establishments of like character abroad.

To provide for the growth and proper classification of the instructive exhibit so as to show the advances that have been made to date in sanitary science, and to facilitate the further practical study of hygiene, so essential to the welfare of the Navy and the public at large, it is recommended that a small amount be used annually from the "Naval hospital fund" to render the establishment, now organized on a permanent basis, complete in all its appointments. Legislation is therefore requested authorizing the Secretary of the Navy to use annually, when deemed necessary, from the appropriation "Naval hospital fund," a sum not to exceed $5,000 for the benefit and improvement of the

present U. S. Naval Museum of Hygiene, located in the old observatory grounds, Wagshington, D. C.

U. S. NAVAL LABORATORY AND DEPARTMENT OF INSTRUCTION.

The regulation issued by the Department over a year ago, creating a system of instruction for assistant surgeons immediately after passing a successful examination for admission into the Medical Corps of the Navy, has proved as valuable as predicted. The medical officers attached to the hospital, examining board, laboratory and department of instruction, New York, have all been interested in the work, and the rules and regulations during the period of instruction have been fully complied with. Four assistant surgeons have had the advantage of the prescribed course, and the records of their work, on file in the Bureau, afford satisfactory evidence of the manner in which it has been done. Two medical officers have taken partial courses in bacteriology and analytical chemistry, and two assistant surgeons who have just completed successful examinations are at present undergoing instruction.

SICK QUARTERS ON BOARD VESSELS OF WAR.

A special report relating to the importance of providing suitable accommodations on board of our ships for the care and treatment of the sick and wounded of the Navy has already been submitted to the Department. The plans of all vessels in commission undergoing construction and nearing completion, have been carefully examined with a view of selecting suitable locations for sick quarters, and recommendations madewhen required. On board of ten vessels no quarters are designated for the treatment of the sick and wounded; in the case of the *Minneapolis* the omission was probably due to an oversight, as this vessel was designed on similar lines to her sister ship the *Columbia.*

Subsequent to the examination of the plans of our uncompleted warships, the drawings of the armored cruiser *Brooklyn* and the battleship *Iowa* were submitted to the Bureau, and, in consultation with the president of the board of inspection and survey and the Bureau of Construction and Repair, suitable sick quarters were located.

It is earnestly suggested that hereafter before sick quarters are assigned on our ships this Bureau may be consulted as to their location.

The medical officer assigned by the Department as a member of the board of inspection and survey has been instructed to pay special attention to the subject of sick quarters, sanitation, and general ventilation of all vessels inspected.

STATISTICAL REPORT AND BOOK OF INSTRUCTIONS.

The statistical report has been carefully revised and elaborated, having in view the necessity for more complete and accurate data on which to base the health record of the Navy.

As soon as practicable the subject of the revision of the Book of Instructions for Medical Officers will be considered, in order to make it accord with the regulations, general orders, and circulars issued subsequent to its publication.

The Bureau has also under consideration the preparation of a form for the guidance of medical officers in making their annual reports.

REVISION OF SUPPLY TABLE.

The supply table of the Medical Department of the Navy has been

revised and enlarged to meet the changes and advancements that are constantly taking place in the department of applied medicine. In its preparation the Pharmacopœia has been carefully consulted; new drugs of recognized professional value have been added to the list, and many articles that have become obsolete or regarded as of doubtful utility have been abolished.

The supply of tablet triturates, compressed powders, and hypodermic tablets has been increased with the view of meeting the requirements of the service, and much care and attention have been given to the selection and rearrangement of supplies under the heads of hospital stores, surgical dressings, and dispensary and hospital furniture.

The necessity for such revision becomes obvious when we realize the rapid strides that are annually taking place in all that pertains to modern and progressive medicine, and such changes in the list will be made whenever new appliances and remedies receive official recognition by the profession, and as often as the interest of the service demands it.

There has been a complete revision of the outfit of surgical instruments and appliances, and the Medical Department of the Navy will soon be supplied with every article the practice of modern surgery demands.

VACANCIES IN THE MEDICAL CORPS OF THE NAVY.

During the fiscal year ending June 30, 1894, 30 permits were issued by the Navy Department to candidates to appear before the naval medical examining boards in session at New York and San Francisco. Of this number, 10 failed to present themselves for examination, 5 were rejected physically, 12 were rejected professionally, and 3 were found physically and professionally qualified for admission as assistant surgeons into the Medical Corps of the Navy.

The above record, showing a rejection of 85 per cent of candidates examined, is not satisfactory, particularly when we contrast the large number of properly qualified applicants for similar positions in the Army and Marine hospital services, and the promptness with which such vacancies are filled.

The examination to which candidates for admission are subjected is in accord with the teaching and requirements of our medical schools, being within the capacity of every young medical man, properly equipped for the practice of his profession, and the large percentage of failures, as shown by the record of the examining boards, can only be accounted for on the supposition that the naval service, from lack of suitable inducements, does not attract the class of men who would tend to advance the standard of professional excellence, or from whom a greater knowledge of medical skill and military efficiency might be expected.

Notwithstanding that every reasonable effort was made by the Department to fill the corps, there remained at the close of the fiscal year ending June 30, 1894, eight vacancies.

ATTENDING SURGEONS.

Officers of the Medical Corps of the Navy, assigned to duty as attending surgeons in the various cities on the Atlantic and Pacific coasts, have rendered valuable service, and have been able to profit by the advantages offered for the study of diseases and operative work at the large hospitals and dispensaries. Coming in contact with the learned

general practitioner and accomplished specialist, they are afforded opportunities for seeing unusual types of disease and accident and of gaining invaluable professional information to assist them in their future duties on board ship.

NAVY PENSIONS.

In order to show the great increase of work in this Department, attention is invited to the following comparative figures taken from the records of the Bureau:

Pension cases.

1889	Number on hand June 30, 1888	146
	Received during fiscal year ending June 30, 1889	2,399
	Answered during fiscal year ending June 30, 1889	2,483
	Number on hand June 30, 1889	62
1890	Number on hand June 30, 1889	62
	Received during fiscal year ending June 30, 1890	3,082
	Answered during fiscal year ending June 30, 1890	2,937
	Number on hand June 30, 1890	207
1891	Number on hand June 30, 1890	207
	Received during fiscal year ending June 30, 1891	1,830
	Answered during fiscal year ending June 30, 1891	2,033
	Number on hand June 30, 1891	4
1892	Number on hand June 30, 1891	4
	Received during fiscal year ending June 30, 1892	1,707
	Answered during fiscal year ending June 30, 1892	1,692
	Number on hand June 30, 1892	19
1893	Number on hand June 30, 1892	19
	Received during fiscal year ending June 30, 1893	1,222
	Answered during fiscal year ending June 30, 1893	1,234
	Number on hand June 30, 1893	7
1894	Number on hand June 30, 1893	7
	Received during fiscal year ending 30, 1894	5,987
	Answered during fiscal year ending June 30, 1894	5,994
	Number on hand June 30, 1894	0

The following record also shows the character and amount of other work done, all having more or less connection with pension cases:

Number of cases for board of medical examiners received and answered during year ending June 30, 1894	116
Number of cases for retiring board received and answered during fiscal year ending June 30, 1894	28
Number of cases from Judge Advocate-General of the Navy received and answered during fiscal year ending June 30, 1894	45
Number of cases from Civil Service Commission received and answered during fiscal year ending June 30, 1894	12
Number of Congressional, Fourth Auditor, and miscellaneous letters received and answered during fiscal year ending June 30, 1894	90
Number of reports of medical survey received during fiscal year ending June 30, 1894	504
Number of certificates of death received during fiscal year ending June 30, 1894	120
Number of reports of physical disqualification received during fiscal year ending June 30, 1894	173

Great difficulty was experienced during the past fiscal year in getting out promptly the medical records of claimants in answer to calls from the Pension Office. So serious did this state of affairs become, owing to insufficient clerical force, that on April 14, 1,742 cases remained unanswered. To overcome this difficulty and bring the work up to date, two additional clerks were assigned temporarily and the hours of duty in the Bureau extended until 5 p. m. In about one month, May 18, there were no calls from the Pension Office remaining unanswered, and the work has since been kept up to date.

AMERICAN MEDICAL ASSOCIATION. ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES. AMERICAN PUBLIC HEALTH ASSOCIATION.

Acting upon the recommendation contained in the Bureau's last annual report, application was made to the Department by the secretaries of the several medical associations above mentioned for the detail of medical officers to represent the Medical Department of the Navy at their annual meetings.

Medical officers detailed for such duties were informed to notify the Department of the nature of the subjects which they proposed presenting at the meetings, and on adjournment were directed to submit reports in full on the papers presented, and any points of interest that may have developed during their discussion.

The fourth annual meeting of the "Association of Military Surgeons of the United States" met in Washington on May 1, 2, and 3 last, the Medical Department of the Navy being represented by Medical Director A. L. Gihon and Surg. H. G. Beyer. Medical Director Gihon and Surg. Beyer read papers on the "Transportation of sick and wounded on board ship" and "First aid on the battlefield," respectively. Surgeon Beyer's paper will be found attached to this report.

In compliance with the request of Dr. James F. Hibbard, president of the American Medical Association, addressed to the Department, and referred to this Bureau by the honorable Secretary of the Navy, Medical Inspector George W. Woods and Surg. M. H. Crawford were ordered to attend the annual meeting of this association, which convened on the 5th of June last at San Francisco, Cal. Medical Inspector Woods read a paper on "The use of acetanilid in medicine and surgery, with special reference to its surgical application." The subject of Surg. Crawford's paper was "Stricture of the male urethra." Both papers will be found appended to this report.

Application having been made through the proper channel by the president of the American Public Health Association for the detail of delegates to represent the Medical Department of the Navy at the annual meeting of this association, held at Montreal, Canada, September 24–28, 1894, Medical Director A. L. Gihon was ordered by the Department on this duty. His report of the proceedings of this meeting will be submitted at a future date.

ELEVENTH INTERNATIONAL MEDICAL CONGRESS AT ROME, ITALY.

On August 4, 1893, the State Department was notified, through the Italian minister at Washington, that the meeting of the Eleventh International Medical Congress had been postponed until April, 1894, on account of the appearance of cholera at Rome and other Italian cities.

Upon receipt of this information, Medical Director Dean was ordered to return to the United States upon the completion of the other duties assigned him. His report upon naval and military hospitals, naval medical schools, etc., is herewith submitted to the Department.

The Department of State, January 11, 1894, on behalf of the Italian Government, renewed its request that delegates be detailed to represent the Medical Department of the Navy at the Eleventh International Medical Congress, to be held at Rome, Italy, from March 29 to April 4, 1894, inclusive. In order that the Medical Corps should be officially represented the Navy Department detailed Medical Inspector F. L. Dubois and Surg. C. A. Siegfried for this duty, directing them to report by letter to the Surgeon-General of the Navy for special

instructions. The reports of these officers, relating to the subjects to which they were directed to give special attention, and forming a part of the proceedings of the congress, are submitted under the head of special reports.

EIGHTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

Under date of December 27, 1893, the Austro-Hungarian minister addressed a communication to the Department of State, extending, on behalf of the Austrian Government, an invitation to the Navy Department for official representation at the meeting of the Eighth International Congress of Hygiene and Demography, to be held at Budapest, Austro-Hungary, September 1–9, 1894.

In compliance with this request orders were issued by the Navy Department to Medical Director A. C. Gorgas, U. S. Navy, in charge of the U. S. Naval Museum of Hygiene, to proceed to Budapest as the representative of the Medical Department of the Navy. He was also ordered to report to the Surgeon-General for special instructions in connection with this duty, and his paper on "Naval Hygiene," read before the congress, together with other subjects of professional interest to which his attention was directed in his letter of special instructions, will be submitted in a future report.

When the system is inaugurated of detailing officers as naval medical attachés at important embassies abroad, as suggested in my last annual report, the duty above referred to will be performed by such officers, avoiding the necessity of ordering special delegates from the United States.

NAVAL HOSPITAL BUILDING AT ANNAPOLIS, MD.

This building was closed by act of Congress, May 4, 1878, and from that time until now no repairs of any note have been made. The building, consequently, has greatly deteriorated, and should it be required for hospital purposes, would require expensive and extended repairs, requiring a special appropriation to do the work.

U. S. NAVAL HOSPITAL, WIDOW'S ISLAND, ME.

This hospital was built in the year 1887, by a special appropriation of Congress, to meet the necessities then existing for some suitable hospital accommodations in a Northern latitude for the reception of patients returning home in infected ships.

Before the rehabilitation of the Navy vessels were built entirely of wood; many of them had been in service during the war, and all of them, by gradual decay, filled with rotten timbers and worn-out construction material, defective ventilation, etc., had become susceptible to yellow-fever poison whenever a port in the West Indies or elsewhere was visited where the disease existed. It was almost impossible at that time, in spite of the greatest care and strictest sanitary rules, to keep such a class of vessels free from yellow fever. Scarcely a summer passed but two or more vessels returned with the disease on board, and the only refuge was at some point North where the ship could be broken out and the sick sent ashore for treatment.

Had like conditions continued to exist, the hospital at Widow's Island to-day would be a most valuable and necessary part of the naval medical establishment. As it is, however, every thing is changed; naval architecture has undergone a radical departure, wooden vessels

have disappeared, and steel ships of every class and size, well ventilated and equipped, have taken their place.

These new steel vessels, with proper sanitary precautions, are susceptible only in a small degree to the introduction and retention of the yellow-fever poison, and should one of this class of vessels arrive north with the fever, or any other infectious disease, on board, under the present enlightened methods of ship sanitation, the vessel would not be ordered to make a long cruise to Widow's Island, where there is only hospital accommodations without a modern plant for disinfection, but would be sent to the quarantine station at New York, where all improved appliances exist, where the sick could be cared for, and vessels with their equipment declared free from infection in a very few days, with little inconvenience, and certainly with much less loss to the Government, than by the obsolete methods proposed to be carried out at Widow's Island.

Not a patient has been treated in this hospital since its erection, and the buildings year after year require additional repairs to keep them in serviceable condition. In view of all these facts, it is deemed advisable to dispose of the property as soon as it can be done on satisfactory terms.

I beg to recommend, therefore, that, through Congressional action, the Secretary of the Navy be authorized to dispose of this hospital and devote the proceeds derived from the sale of said property to the renovation of such naval hospitals as require to be placed in a modern sanitary condition.

It is believed, with the increasing popularity of the coast of Maine as a summer resort, that advantageous and satisfactory terms could be obtained for the Widow's Island hospital, being situated but a short distance from Mount Desert and Bar Harbor.

U. S. NAVAL HOSPITAL, PHILADELPHIA, PA.

A sudden increase of sick at this establishment required occupancy of the entire hospital, and the north wing, which has been out of commission for several years, has been restored to its legitimate purposes. This part of the building was found sadly out of repair, requiring new water-closets, renewal of surface drains and connections, new water and waste pipes, repair of verandas, roof, gutters, ventilators, chimneys, water-tanks, steam boilers, and heating apparatus, and repainting of all tin, iron, and woodwork to put it in habitable condition for the reception of patients.

On the completion of the work the hospital will be in condition to meet the wants of the station, and provide accommodations for the sick that may have to be transferred from New York during the repairs of the hospital at that station.

U. S. NAVAL HOSPITAL, NEW YORK.

In my last annual report the attention of the Department was called to the necessity of enlarging and improving this hospital, and of building a retaining wall to properly protect Government property.

The subject received the full approval of the Department, and authority was asked, and granted by Congress, to use $69,000 from the appropriation "Naval Hospital Fund" of the sum accruing from the sale of New York hospital property under act of July 2, 1890, to the city of Brooklyn.

It is hoped this amount will be sufficient to accomplish all the repairs and hospital extensions proposed.

The buildings and grounds have been carefully inspected with a view commencing as soon as possible the much needed work, and plans l specifications relating to the proposed changes will be submitted an early date.

Civil Engineer Endicott and Medical Inspector Penrose have reported the Bureau in connection with this special duty.

SANITARY RULES.

The health of the squadron in the infected harbor of Rio de Janiero ring the recent troubles in Brazil affords convincing proof of the ability of sanitary rules, if carefully and closely followed.

During periods varying from two to five months the *San Francisco*, *w York*, *Charleston*, *Newark*, and *Detroit*, with a combined complent of 1,762 officers and men, suffered exposure to epidemic influences yellow fever, and the sanitary precautions used against the introction of the disease were the only safeguard, and proved most effint, thereby enabling an effective military force to be kept constantly the spot.

While war vessels of every other nation had the disease on board, l while merchant vessels from different parts of the world were, in ny instances, deprived of their entire crew, there was only one e, a paymaster's yeoman, on an American man-of-war, and that , from its history, was preventable.

The experience at Rio affords a valuable lesson in sanitary history l should not pass unheeded. Interesting reports have been received m the medical officers of the above-named vessels relating to the demic, and when all the replies are received to the Department's ular letter of June 21, 1894, relating to the "precautionary sany measures used and supposed to contribute in preventing the introtion of yellow fever on board," it is hoped such reliable information l be obtained that the Department will be able to formulate sanitary es and regulations on the subject that will be of value as a guide to sels of the Navy when obliged in future to serve in an infected port. h "general sanitary rules" embracing special precautionary meass against the introduction of yellow fever and cholera on board sels of war will be submitted at an early date with the request that y be made Department regulations.

AMBULANCES.

t is absolutely necessary that our large hospitals be supplied with bulances of modern construction, and a system of drill adopted at different establishments, so as to have a complete and effective tem for the transportation of sick and wounded men.

This subject has never received the attention it merits, and the delays l discomforts attending the transfer of men to hospital are largely e to the lack of properly constructed ambulances and an efficient ganization. Until this service is organized and incorporated in the ties of a hospital corps, modern ambulances should be supplied at e to our principal hospitals, which would be a great improvement r the present plan for transporting the sick, and save no end of disnfort and suffering. With light modern ambulances at all of our pitals subject to telephone call either night or day from ships or y-yards, the summons could be answered at once, and there is rcely a station where the sick or wounded man would not be delivd to the hospital inside of thirty minutes.

The present clumsy method of transportation of the sick and wounded, with their bags and hammocks in the same uncomfortable vehicle, without any pretensions to ambulance fittings, should be abolished.

To correct this defect in hospital transportation, the subject of ambulances in use at the present day, their construction and cost, has been carefully considered, and it is found that the ambulance made for use in Central Park and at the New York, Roosevelt, and Presbyterian hospitals, New York City, are of design and fittings best adapted to the naval service. A small appropriation has, therefore, been submitted for the purchase of ambulances of the type referred to, in order that the sick and wounded of the Navy may be provided with the same conveniences of transportation that exist at all large civil establishments.

PASSED ASSISTANT SURGEONS.

The bill for the examination and commissioning of passed assistant surgeons, submitted to Congress with the approval of the Department, was favorably considered by the committees of both the Senate and House of Representatives, but legislative action was postponed pending the consideration of the bill relating to the personnel of the Navy.

A physical, mental, moral, and professional examination should obtain for every promotion in the service, and particularly for this grade in the Medical Corps, where, under existing regulations, no examination to determine physical and professional qualifications can be exacted until promotion to medical inspector, an average period of nearly thirty years since the last examination.

It is strongly recommended that the Department urge the passage of the present bill, now pending in Congress, so as to remedy, as soon as possible, the defective system acting so injuriously to the interests of the Medical Corps of the Navy, provided the question is not settled in the personnel bill at the next session of Congress.

HOSPITAL CORPS FOR THE NAVY.

The necessity of an organized hospital corps, well instructed, drilled, and equipped for all duties called upon to perform, becomes more and more apparent as new modern vessels of war are being completed and placed in commission.

The services rendered by such a corps would be invaluable to the Navy. Its usefulness has already been demonstrated in our Army, and the attention that is being paid to perfecting the system by all first-class naval powers is convincing proof that immediate action should be taken in the matter by our own service.

Many important questions relating to the handling of wounded on board modern vessels of war in action, forms of ship ambulances, different methods of transportation, landing parties on shore, instructions to men, first aid to wounded, proper care of sick and wounded ashore and afloat, etc., have all to be considered, and reasonable and effective plans adopted that can only be done by an efficient organization created solely for such special work.

In my last report attention was called to systematic instruction for nurses or baymen at the different naval hospitals in order to prepare them for duty ashore and afloat, and it is believed that by proper enactment, embracing such men and apothecaries into one corps, with an incentive for advancement, the Navy would soon be provided with a

body of men well trained, and ready for any emergency in peace or war.

Organized hospital corps, composed of men who have been specially trained and disciplined for their duties, should form a part of the medical department of every military organization, whether Army or Navy.

An act "To establish a hospital corps of the Army of the United States" was approved March 1, 1887. Such organizations have existed for many years in the principal armies and navies of the world.

In England the necessity of a hospital corps to improve the efficiency of the medical department of the British navy was recommended in a report made by a special commission on the subject, and immediately adopted by the British Admiralty. The system has proved most advantageous, and men are enlisted, instructed, and trained for this special work.

In the French navy the same course has been pursued and the organization of their hospital corps constantly improved by additional decrees issued in 1883, 1885, and 1887.

The pay specified for the several rates proposed in the bill is not considered excessive, and is absolutely essential in order to secure a desirable class of men.

The slight increase of pay proposed in the bill for apothecaries is based upon long and faithful service.

The rates by which the men enlisted in the hospital corps are designated are considered appropriate and applicable to duties they will be called upon to perform.

It is believed that the provisions contained in this bill are necessary and afford the only means by which the present defective system, so harmful to the interests of the service and so unjust to sick and wounded officers and men of the Navy, can be remedied.

The number of nurses and apothecaries employed at present in the Medical Department of the Navy is about 200, and by enactment of the proposed bill these men will be immediately available for service in an organized hospital corps, and without additional cost to the Government.

It is strongly recommended that this subject may receive the sanction of the Department and be submitted for legislative action during the next session of Congress.

The health of the Navy, according to statistical tables appended, has been most favorable for the year 1893.

In concluding this report it may not be out of place to state that it is the endeavor of the Bureau to have the Medical Department of the Navy as efficient as it can be under existing laws, and, so far as the appropriations will allow, to have the hospitals at different stations always in readiness for the reception of their full quota of sick, to make modern changes and improvements, to pay special care to roads and grounds, and to keep the buildings in a proper state of repair. To this end the electric light has been installed at the naval hospitals at Boston, New York, Washington, Norfolk, Mare Island, and Yokohama, Japan. The repairing and equipment of south wing of naval hospital, Norfolk, Va., fitting up antiseptic operating rooms and introducing elevators at the several hospitals, and supplying modern ambulances, are all under consideration.

Very respectfully,

J. R. TRYON,
Surgeon-General U. S. Navy.

Hon. H. A. HERBERT,
Secretary of the Navy.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the Bureau of Medicine and Surgery, Navy Department.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
SALARIES.			
Chief clerk (appropriated, act of July 31, 1894)	$1,800.00		
One clerk of class 3 (same act)	1,600.00		
Two clerks of class 2 (same act)	2,800.00		
One clerk of class 1 (same act)	1,200.00		
Two clerks (same act)	2,000.00		
One assistant messenger (same act)	720.00		
One laborer (same act)	660.00		
One janitor for naval dispensary (same act)	600.00		
One laborer for naval dispensary (same act)	480.00		
		$11,860.00	$11,860.00
MEDICAL DEPARTMENT.			
For surgeons' necessaries for vessels in commission, navy-yards, naval stations, Marine Corps, and Coast Survey, and for the civil establishment at the several naval hospitals, navy-yards, naval laboratory and department of instruction, museum of hygiene, and Naval Academy, $60,000 (appropriated, act of July 26, 1894)	.....	60,000.00	60,000.00
NAVAL HOSPITAL FUND.			
For maintenance of the naval hospitals at the various navy-yards and stations, and for care and maintenance of patients in other hospitals at home and abroad, $20,000 (appropriated, act of July 26, 1894)	.....	20,000.00	20,000.00
CONTINGENT.			
For freight, expressage on medical stores, tolls, ferriages, transportation of sick to hospitals, transportation of insane patients; care, transportation, and burial of the dead; advertising; telegraphing; rent of telephones; purchase of books and stationery; binding of medical records, unbound books, and pamphlets; postage and purchase of stamps for foreign service; expenses attending the medical board of examiners; rent of rooms for naval dispensary; hygienic and sanitary investigation and illustration; sanitary and hygienic instruction; purchase and repair of wagons and harness; purchase of and feed for horses and cows; trees, plants, garden tools, and seeds; furniture and incidental articles for the museum of hygiene, naval dispensary, Washington; naval laboratory, sick quarters at Naval Academy and marine barracks, surgeons' offices and dispensaries at navy-yards and naval stations; washing for medical department at museum of hygiene, naval dispensary, Washington; naval laboratory and department of instruction, sick quarters at Naval Academy and marine barracks, dispensaries at navy-yards and naval stations, and ships, and rendezvous, and for minor repairs on building and grounds of the U. S. naval museum of hygiene, and all other necessary contingent expenses, $25,000 (appropriated, act of July 26, 1894)	.....	25,000.00	25,000.00
REPAIRS.			
For necessary repairs of naval laboratory and department of instruction, naval hospitals and appendages, including roads, wharves, outhouses, sidewalks, fences, gardens, farms, and cemeteries, $20,000 (appropriated, act of July 26, 1894)	.....	20,000.00	20,000.00
For supplying three naval hospitals with ambulances of modern construction, to replace vehicles condemned as useless, $1,800 (submitted)	1,800.00	1,800.00	

REPORT

OF THE

COMMANDANT OF UNITED STATES MARINE CORPS.

HEADQUARTERS U. S. MARINE CORPS,
Washington, D. C., October 1, 1894.

SIR: I have the honor to submit my annual report of the condition of the U. S. Marine Corps for the past year.

During that time I have made a personal inspection of all the Northern posts and found them in excellent condition. At Brooklyn the repairs authorized in the last naval appropriation act are being made with as much rapidity as possible, under the superintendency of Capt. Randolph Dickins, who is acting under the direction of the quartermaster U. S. Marine Corps, and when completed will place that post in very good repair, though much more should be done, such as relaying water pipes and introducing steam and electric lights, which will be called to the Department's attention at some later date.

On October 1, 1894, there were 2,097 enlisted men in the corps, only 3 short of the authorized number. Of these, 1,196 were on duty at the different shore stations and 901 on board ships in commission.

During the past year the total number of men appropriated for has been nearly continuously in the service, which has enabled the duty to be performed with less hardship to the men, and in consequence the number of desertions has been very materially decreased. I have always been satisfied that desertions in the Marine Corps were caused, in a large measure, by the hard work our men are called upon to perform, and the above condition of affairs seems to bear me out in this opinion. The men nearly everywhere have been able to have two days off guard, which is a great relief from the severity of "day on and day off," to which they have for a long while been subjected, but still, in comparison with the Army (where men are never less than five days off guard), it will be seen that this is hard duty and too much of a tax on the physical energies of the men, and to produce even better results we should have increased numbers.

The demand increases every day, both on shore and afloat, particularly in view of the many new vessels which will soon be placed in commission, and I again earnestly request that the Department will take the necessary action to have the appropriations increased for more men, in accordance with my many previous recommendations.

Since my last report the barracks at the U. S. Naval Station, Port Royal, S. C., have been completed, and in November the men moved in. They are well built and very comfortable for the small detachment of twenty men we have serving there.

The commandant of this station has requested me to detail an officer and five men as an increase of the marine guard now there, as with

the near completion of the dry dock he will have use for their services, and if it meets with the Department's approval, it is my intention to comply with Commander Rockwell's request at an early date.

The barracks at the U. S. naval station, Newport, R. I., were also completed in March last, and the guard of the U. S. training ship *Richmond* was transferred on shore on April 1, and a post of the Marine Corps has now been established there, with Capt. W. S. Muse in command.

The quarters for the officer in command of marines at Sitka, Alaska, which I recommended in my last report be built, were not provided for, the item in the last estimates having been stricken out by the Department. I have again directed the quartermaster to insert a provision for these quarters in the estimates for the next fiscal year, and hope it may be allowed to stand, the necessity therefor having been represented in my last annual report, to which attention is respectfully invited.

The marines have rendered valuable services at this far-away post on several occasions during the past year in the suppression of fire, once having been called out in the dead of night and in the midst of snow, and the station is an important one for the Government to maintain.

The quartermaster's reports of his inspections at the different posts regarding the condition of the public buildings show most of them to be in a good state of repair, with the exception of minor alterations, painting, etc.

At League Island a board of survey recommends that the coal house, men's water-closets, and the line of dike along the north bank on the back channel be raised, and that the area in and about the barracks inclosure be filled in, to prevent damage from high tides and floods, the total cost being estimated at $4,500, which sum has been included in next year's estimates, in accordance with the Department's orders on the subject.

At Mare Island the repairs required are so extensive that I have asked for a specific appropriation of $6,000 to make them, as recommended by boards of survey.

At Boston the steam-heating apparatus, for which provision was made in this year's appropriation act, is being placed therein under contract.

The School of Application here has commenced the fourth year of its existence, and the seven second lieutenants appointed from this year's graduating class at the Naval Academy are now undergoing instruction there, also a new class of non-commissioned officers and privates.

A board of visitors, consisting of Commodore R. W. Meade, U. S. Navy, Brig. Gen. Albert Ordway, commanding District of Columbia militia, and Maj. G. C. Reid, adjutant and inspector U. S. Marine Corps, at my invitation, witnessed the closing exercises of last year's class, and a copy of their report relative thereto is herewith appended, together with a copy of the annual report of Capt. Paul St. C. Murphy, the commanding officer in charge of the school, all of which I desire printed with this report.

At the request of Capt. H. C. Taylor, U. S. Navy, president, and by direction of the Department, I detailed Capt. Richard Wallach, U. S. Marine Corps, for duty as an instructor at the Naval War College, at Newport, R. I., and have received the most gratifying accounts of the industry and ability displayed by this officer in the performance of this duty, and his lectures on the subjects assigned him have proved inter-

esting and valuable. His work has been thoroughly satisfactory to Capt. Taylor, who requests that he be allowed to remain there as a member of the permanent staff of the college.

I feel obliged to again invite the attention of the Department to the necessity for a fireproof building here for the use of offices for myself and staff and the safe keeping of the valuable records of the corps, to which reference was made in my report of last year, and request that authority be granted to estimate for a sum sufficient for the purpose. I would feel derelict in my duty did I not call attention to the danger to which these valuable public records are constantly exposed.

For the better transaction of business the commandant of the corps should have a suitable office provided for him in the Navy Department building, where he could spend several hours each day in attending to affairs pertaining to the corps requiring the action of the Department.

To aid in the suppression of unlawful uprisings of people in the State of California, a battalion of marines from the marine barracks, Mare Island, Cal., and the receiving ship *Independence*, under the command of Maj. P. C. Pope, and with Capt. O. C. Berryman and First Lieuts. C. M. Perkins, H. L. Draper, and R. McM. Dutton, was detailed for duty with the Army troops in the department of California under the immediate command of Col. William M. Graham, Fifth Artillery, U. S. Army. To this battalion was attached at various times Company E of the First Infantry and Batteries A, K, and L of the Fifth Artillery, U. S. Army, all under Maj. Pope's command. It was stationed for most of the time in and around Sacramento, and was on duty guarding and protecting trains and other railroad property in that vicinity, and assisted in keeping open the transmission of United States mails and interstate commerce, sometimes being sent 40 or 50 miles away for this purpose.

The efficient and satisfactory manner in which the marines performed the various duties assigned them, surrounded as they were by innumerable obstacles and suffering from the intense heat, is testified to by the department commander, Brig. Gen. T. H. Ruger, U. S. Army, Col. Graham, the immediate commanding officer of the forces of which Maj. Pope's battalion formed a part, the commandant, navy-yard, Mare Island, Cal., and the Acting Secretary of the Navy. Copies of these various comments are attached hereto, and I request may be printed with this report.

Maj. Pope himself reports that the conduct of officers and men was excellent, not a report of any note being made against the command. He states that they were "ready, cheerful, full of zeal, respectful in language and deportment, so much so as to call forth praise and admiration from all officers with whom they came in contact."

Another detachment of marines from the U. S. S. *Charleston* was on duty with the naval brigade stationed at Oakland, Cal., under the command of Lieut. Commander W. H. Reeder, U. S. Navy, which was also coöperating with the Army, and rendered important and valuable services, as stated by Gen. Ruger.

It is most gratifying to me to know that the marines have again proved themselves efficient and useful in the performance of any and all duty that may be assigned them, as evidenced by this service, and I am particularly pleased with the work done by this fine battalion from Mare Island, which has reflected additional credit on the corps. My thanks are due and heartily tendered to all the officers and men composing it, and especially to Maj. Pope, who so ably commanded it and made possible by his zeal and strict attention to duty such excellent results.

The marines stationed at the World's Columbian Exposition were withdrawn gradually a ter the close of the fair, as their services could best be spared, one detachment acting as a guard in bringing to Washington the valuable relics which formed part of the exhibit of the Department of State, loaned by foreign governments.

I inclose a copy of the report of Capt. Paul St. C. Murphy, commanding this detachment, in which is embodied the commendatory letters regarding it which were received from the director-general, the Secretary of State, and the Acting Secretary of State, and request that it be printed with mine.

In my letter of September 1, 1894, inclosing the annual estimates for the support of the corps for the next fiscal year, to which attention is respectfully invited, mention is made of the deficiency under the head of "Provisions M. C.," which annually occurs, with an explanation of the manner in which it happens, and a proposed remedy, which latter it is hoped can be carried into effect. This plan was approved by the House of Representatives, but was rejected by the Senate when the appropriation bill went to that body for consideration.

It is as embarrassing and annoying to me to be obliged to report a deficiency in any of the appropriations for the support of the corps as it is for the Department to receive it, and it is my earnest aim to always avoid such a contingency. As an actual fact only an apparent deficiency occurs, as all the money appropriated under the head of the Navy is not expended when less than 1,000 men of the Marine Corps are afloat.

Since my last report there have been 763 casualties in the enlisted strength, caused by discharges, desertions, deaths, and retirements, and in the same time there have been 746 enlistments and reënlistments.

The following retirements among the officers have taken place: Maj. Augustus S. Nicholson, adjutant and inspector, May 1, 1894, after a service of over forty-seven years on the active list; Capt. George T. Bates, May 2, 1894, for disability in the line of duty, having been brought before a board, as a first lieutenant, for examination for promotion to captain, and failing to pass physically, was, in accordance with law, retired with the rank to which his seniority entitled him to be promoted. First Lieut. James A. Turner was also retired for disability in the line of duty on December 25, 1893.

Col. M. R. Kintzing, Maj. William R. Brown, and Capt. L. E. Fagan, all on the retired list, died respectively December 4, 1893, August 2, 1894, and January 4, 1894.

Capt. Daniel Pratt Mannix also died on February 6, 1894. At the time of his death he was in command of the Marine Barracks here, and in charge of the School of Application, and his untimely decease was a matter of extreme regret. He was the first officer in charge of this school, and by his untiring energy and industry, and close attention to all details, soon brought it to a state which enabled excellent results to be shown from its workings. His death is a loss to the corps. He has been succeeded by Capt. Paul St. C. Murphy, an officer of excellent reputation and tried ability, who will, I feel sure, in his new duties add another success to those already made by him in other fields.

First Lieut. Theodore G. Fillette was dismissed June 29, 1894.

Upon the retirement of Maj. Nicholson, Capt. George C. Reid was appointed adjutant and inspector, and is now on duty at these headquarters.

Maj. Reid is an officer of large experience and much ability, having served over thirty years in the Marine Corps; and his appointment was in every way a most excellent one.

The usual estimates were forwarded to the Department on the 1st ultimo, as indicated above, and show an increase over the appropriations for the current year, made necessary for reasons explained in my accompanying letter. A duplicate set is inclosed herewith.

Very respectfully, your obedient servant,

CHARLES HEYWOOD,
Colonel Commandant.

The SECRETARY OF THE NAVY,
Washington, D. C.

WASHINGTON, D. C., *May 17, 1894.*

SIR: At your request we witnessed, May 3, the annual closing exercises of the School of Application, established some years since at the U. S. Marine headquarters in this city.

These exercises were conducted in accordance with the programme attached herewith, and, in our opinion, reflected great credit upon all concerned, but especially upon Second Lieuts. Williams, Lane, McLemore, Theall, Richards, and McKelvy, and the noncommissioned officers who participated with them in the drills mentioned in the programme.

We were especially impressed with the torpedo exercises from a launch secured upon a block cradle on the parade ground, the artillery drills with Gatling and Hotchkiss guns, the street-riot drills, attack of enemy's position, etc.

We think the country, and especially the naval service, are to be congratulated on the establishment of so practical a school of instruction, and think that the good work already accomplished marks a step in advance and enhances the already acknowledged value of the Marine Corps to the Naval Establishment.

We beg leave to congratulate the colonel commandant and his officers at headquarters and elsewhere upon the practical success thus far achieved and on the proficiency displayed by those who took part in the exercises.

With suitable legislation and some financial aid from Congress, which surely should be given, the historic corps you have the honor to command should be easily in the foreground of modern military demands.

Very respectfully,

R. W. MEADE,
Commodore, U. S. Navy, President.
ALBERT ORDWAY,
Brigadier General, District of Columbia Militia.
GEO. C. REID,
Major, U. S. Marine Corps, Adjutant and Inspector.

Col. Commandant CHARLES HEYWOOD, U. S. M. C.,
Headquarters U. S. Marine Corps, Washington, D. C.

SCHOOL OF APPLICATION, U. S. MARINE CORPS,
Washington, D. C., October 1, 1894.

SIR: I have the honor to submit the following report of the operations of the School of Application for the year ending June 30, 1894:

Capt. D. Pratt Mannix, who had been in ill health for some time previously, died on February 6. He had been commandant of the school from its inauguration, and by his energy, zeal, and high professional attainments contributed largely to its success. I had the honor to succeed him in command on the 8th of March.

The school term began on September 1, 1893, with a commissioned officers' class, comprising the following officers: Second Lieuts. Dion Williams, Rufus H. Lane, Albert S. McLemore, Elisha Theall, George Richards, and William N. McKelvy, 6 in all; and an enlisted men's class of 23 members made up of noncommissioned officers and privates selected from the barracks here and from other posts for the purpose of taking the course.

The prescribed course of studies was pursued successfully by all the commissioned officers and by nearly all the members of the enlisted men's division. Some of the latter were detached before the end of the term, owing to exigencies of the service.

The proximity of the ordnance shops at the navy-yard, Washington, D. C., and of the naval proving grounds, Indian Head, afforded the classes an opportunity to study in all its details the manufacture of modern high-power guns, gun mounts and accessories, and to witness the testing of guns and armor. In this connection an event worthy of special mention occurred on March 23, on which date Mr.

William H. Jaques, the distinguished ordnance engineer, delivered before the school an illustrated lecture on the subject of "Modern Heavy Ordnance and Armor." The lecture was one of rare interest, the whole subject being touched upon in a manner that made it clear and impressive.

The nucleus of a professional library has been established, and the annual expenditure of a small sum of money for books will, in a few years, expand it into a library worthy of the school.

I would call special attention to the services rendered by Lieut. H. K. White, whose connection with the school is about to terminate. He has been director of the studies of the commissioned officers' division for the past two years and has shown marked ability as an instructor. In addition to other work, he has prepared a number of pamphlets on professional subjects, notably one on submarine mines and mining, all valuable adjuncts to the course of instruction pursued at the school, and has in other ways displayed zeal and ability in the performance of his duties.

Lieut. W. C. Neville was detached from duty as an instructor on June 12. He was in charge of the enlisted men's division during the session and as an instructor gave entire satisfaction. He devoted himself earnestly to duty and showed himself a capable officer.

In view of the comprehensive course of studies pursued by the enlisted men in attendance at the school, I would recommend that when a corporal or private holding a certificate of graduation is selected for promotion, his certificate be taken as sufficient evidence of fitness in professional matters, provided he is otherwise eligible and that his promotion comes within a reasonable time, say two years, after his graduation from the school.

The programme of studies pursued during the term is appended, marked A.

The term ended May 3, and the order of exercises attending the graduation of the classes is shown in the programme, appended marked B.

Very respectfully,

PAUL ST. C. MURPHY,
Captain, U. S. Marine Corps, Commanding.

COLONEL COMMANDANT, U. S. MARINE CORPS,
Washington, D. C.

A.

OFFICERS' DIVISION.

Department.	Subject.
Infantry	Instructions for Infantry, U. S. Navy.
	Manual of Guard Duty.
	Blunt's Small-arms Firing Regulations.
	Springfield rifle pamphlet.
	Batchelor's Infantry Fire in Battle.
Artillery	Instructions for Artillery, U. S. Navy.
	Instructions for Light Artillery, U. S. Army.
	Instruction for Gatling-Gun Drill.
	Radford's Gunnery Catechism.
	Drill Book for the New Armaments, U. S. Navy.
Administration and sea service	Accountability Instruction.
	Duties of Marines Embarked.
	U. S. Navy Regulations.
	U. S. Army Regulations.
	Recruiting pamphlet.
Law	Winthrop's Military Law and Courts-Martial.
	U. S. Navy Regulations.
	Administration of Law and Justice, U. S. Navy.
Torpedoes	Sleeman's Torpedoes and Torpedo Warfare.
	Notes on Submarine Mining.
	Spar Torpedo Instruction, U. S. Navy.
	Catechism of Explosives, U. S. Navy.
Engineering	Hutchison's Field Engineering.
	Richard's Military Topography.
	Signaling and Telegraphy.
	Hygiene (lectures).
Military art	Shaw's Modern Tactics.
	Hamley's Operations of War.
	Troops in Campaign.

ENLISTED MEN'S DIVISION.

Department.	Subject.
Infantry	Instructions for Infantry, U. S. Navy.
	Manual of Guard Duty.
	Blunt's Small-arms Firing Regulations.
	Batchelor's Infantry Fire in Battle.
	Springfield rifle pamphlet.
Artillery	Instructions for Artillery, U. S. Navy.
	Instruction for Light Artillery, U. S. Army.
	Instructions for Gatling-Gun Drill.
	Radford's Handbook of Naval Gunnery.
Administration and sea service	Accountability Instruction
	Duties of Marines Embarked.
	Recruiting pamphlet.
Torpedoes	Notes on Submarine Mining.
	Spar Torpedo Instructions, U. S. Navy.
	Catechism of Explosives, U. S. Navy.
Field engineering	Notes on Elementary Field Engineering.
	Signaling and Telegraphy.
Field service	Notes on Minor Tactics.

B.

GRADUATING EXERCISES.

THEORETICAL.

Examination of classes, class papers, maps, etc., in section rooms.

PRACTICAL.

Infantry.

School of the squad: Manual of arms; bayonet exercise.
School of the company: Company drill; company street-riot formation; extended-order drill.
School of the battalion: Battalion street-riot formation.

Field engineering.

The construction of defenses, consisting of shelter trenches, gun pit, covering pit, and rifle trench.

Signals.

Transmission and receipt of messages from various points.

Torpedoes.

The manner of filling, fitting, fusing, and firing contact torpedoes; igniting and burning of gun-cotton primers, preparing service torpedo, and of exploding gun-cotton primer.

Artillery.

Inspection of battery and battery drill.

Minor tactics.

Estimating distances; scouting and outpost service; attack of position, repulse and retreat; attack, formation, and capture of position.

Ceremonies.

Review; dress parade.

[Orders, No. 20.]

OFFICE OF COMMANDING OFFICER, U. S. TROOPS,
Sacramento, Cal., August 8, 1894.

[Extract.]

III. In accordance with telegraphic instructions of the 7th instant from the department commander, Maj. P. C. Pope, U. S. Marine Corps, is relieved from further duty with this command.

In relieving Maj. Pope the commanding officer desires to express his high appreciation of the zeal and judgment shown by him in the exercise of his many difficult duties, under trying circumstances, and to thank him for his uniform courtesy and promptness in the execution of orders. He also desires to compliment Maj. Pope on the efficiency shown by the marine battalion while on duty here. The cheerfulness of officers and men, their soldierly and exemplary conduct, and their disregard of personal comfort in the performance of duty, made them, as a command, deserving the highest praise, and of which he may feel justly proud.

Maj. Pope will proceed to the Mare Island navy-yard and report to the commandant thereof.

The travel directed is necessary for the public service.

By order of Col. Graham:

W. W. GALBRAITH,
First Lieutenant and Adjutant, Fifth Artillery, Adjutant.

HEADQUARTERS DEPARTMENT OF CALIFORNIA,
San Francisco, Cal., August 20, 1894.

SIR: In accordance with the purpose stated in my letter of July 27 last, I desire to testify to the very efficient and important services rendered by the battalion of marines under the command of Maj. Percival C. Pope, Marine Corps, as a part of the force under command of Col. William M. Graham, at Sacramento, Cal., and on the line of the Central Pacific Railroad, during the months of July and the present month.

Very respectfully, your obedient servant,

THOS. H. RUGER,
Brigadier-General, U. S. Army, Commanding Department of California.

The COMMANDANT, MARE ISLAND NAVY-YARD, CALIFORNIA.

[General Orders, No. 18.]

HEADQUARTERS DEPARTMENT OF CALIFORNIA,
San Francisco, Cal., September 4, 1894.

* * * * * * *

It is with satisfaction that the department commander alludes to the services rendered by the naval forces in conjunction with the troops. The battalion of U. S. marines from the Mare Island navy-yard, under immediate command of Maj. Pope, rendered essential service as part of the command of Col. Graham, at Sacramento and on the line of the Central Pacific Railroad. Its performance of duty was very efficient and its conduct excellent.

Important service was also rendered by the force of sailors and marines under command of Lieut. Commander W. H. Reeder, detached for service with the Army from the U. S. steamers *Charleston*, *Monterey*, and *Thetis*, and the ship *Independence*. This force was organized as a naval "brigade" for duty ashore, and performed valuable services at Oakland; it also constituted a reserve relied upon for effective service elsewhere in any emergency that might arise.

* * * * * * *

By command of Brig. Gen. Ruger:

O. D. GREENE,
Assistant Adjutant-General.

[Indorsement on Maj. Pope's report to commandant navy-yard, Mare Island, Cal.]

U. S. NAVY-YARD,
Mare Island, Cal., August 23, 1894.

Approved and respectfully forwarded to the honorable Secretary of the Navy.

The officers and enlisted men of marine battalion have been prompt, energetic, and faithful during the whole of the time from the receipt of my order to "stand by for a call" until their return here with the report of "well done" from Col. Graham.

H. L. HOWISON,
Captain, U. S. Navy, *Commandant Navy-Yard and Station.*

[Second indorsement.]

NAVY DEPARTMENT,
September 5, 1894.

(1) Respectfully forwarded to the colonel commandant of the Marine Corps, for his information.

(2) The Department is pleased to note the prompt and efficient duty performed by the officers and enlisted men of the marine battalion referred to in the indorsement of the commandant of the Mare Island navy-yard, and in the order of Col. Graham, U. S. Army, of August 8, 1894.

* * * * * * *

F. M. RAMSAY,
Acting Secretary of the Navy.

WASHINGTON, D. C., *February 7, 1894.*

SIR: I have the honor to inclose herewith a copy of a report submitted by me to Lieut. Commander E. D. Taussig, U. S. Navy, representative of the Navy Department, World's Columbian Exposition, in relation to the services of the marines in connection with the naval exhibit, World's Columbian Exposition.

Very respectfully, your obedient servant,

PAUL ST. C. MURPHY,
Captain, U. S. Marine Corps.

The COLONEL COMMANDANT, U. S. MARINE CORPS,
Headquarters, Washington, D. C.

WASHINGTON, D. C., *February 5, 1894.*

SIR: I have the honor to submit, agreeably to your instructions, the following report in relation to the services of the marines in connection with the naval exhibit, World's Columbian Exposition.

A detachment consisting of three commissioned officers, Capt. B. R. Russell, First Lieut. George Barnett, and Second Lieut. C. S. Radford, and 50 enlisted men were assigned to that duty, and arrived on the 6th of May. Later 10 additional men joined the detachment, being sent at the request of the Department of State, for duty as a special guard over the exhibits of that Department.

The detachment moved at once into the encampment which had been prepared for it by the quartermaster of the Marine Corps.

The camp, named in honor of the Secretary of the Navy, "Camp Herbert," was located on the Government plaza adjoining the naval observatory, and in close proximity to the model battle ship *Illinois*. It was laid out regularly in streets, with boarded walks, and the grounds bordering upon it and the intervening spaces between the tents were sodded. The grass thrived and added greatly to the attractive appearance of the camp. A tent was assigned to every 2 men, and was furnished with bunks, bedding, washstands, lockers, and other articles necessary to their comfort. Later, when the weather became cold, an oil stove was supplied to each tent. By an arrangement made by the quartermaster of the Marine Corps, the men were subsisted at a restaurant outside the Exposition grounds, at a convenient distance from the camp, and marched to their meals.

Passed Assistant Surg. A. C. H. Russell, U. S. Navy, attached to the model battle ship *Illinois*, gave the necessary medical attention to the men, and displayed at all times an interest in their health and in the sanitary condition of the camp.

The duty performed by the detachment was mainly that of guarding the naval exhibit on board the *Illinois*, the encampment and the naval observatory, together with certain exhibits belonging to the Department of State located in the Government building. During the hours when visitors were admitted thirteen posts were maintained on board the battle ship, two in the Department of State, and one over the camp and observatory. At night, after the exhibits were closed to the public, these posts were reduced to the number necessary to guard against fire, usually four. The duty performed by these sentinels was in many ways more trying than ordinary guard duty, and was both difficult and delicate. The handling of great crowds, made up of people of all nations and of every age and condition of life, required in an extraordinary degree the exercise of patience, courtesy, and firmness. The average daily number of visitors to the battle ship was about 20,000, a number greatly increased on State and other special days, as, for instance, on Chicago day when it was estimated that 70,000 persons visited the ship. The sentinels and

noncommissioned officers of the guard managed the crowds on these occasions with so much judgment and tact that no injury to persons or property worthy of mention occurred at any time.

Besides doing the regular guard duty, the detachment took part in parades and ceremonies of special importance, such as the parade to celebrate the arrivals of the Caravels, the reception and parade in honor of his highness the Maharajah of Kapurtalah, and the parade on Grand Army day, when it acted as escort to the Battalion of Naval Veterans.

On the occasion of the cold-storage fire, which resulted in so deplorable a loss of life, the men of the detachment were present and the service rendered by them was of such a character as to merit recognition by the director-general of the Exposition in a letter commending their efforts and thanking them.

At the close of the Exposition the detachment was charged with the additional and responsible duty of guarding certain relics of Columbus that had been on exhibition in the Monastery of La Rabida. Among these were the papers belonging to the Government of Spain, to the Duchess of Alva, and the Duke of Veragua, together with certain other exhibits, the property of the Vatican and the French Government.

The most valuable of these exhibits were brought by the detachment to Washington and delivered under guard to the Department of State. The remainder (the Vatican exhibit) was, by the direction of the Navy and State Departments, left in Chicago in the custody of his grace Archbishop Ireland.

Capt. B. R. Russell was relieved from command of the detachment at the end of July, 1893, and Lieut. Barnett was left in charge until August 4, at which date I relieved him and assummed command.

The detachment remained intact until the close of the Fair, when its strength was gradually reduced. This reduction took place as follows:

(1) November 2, 20 men were sent to the navy-yard, New York, for duty on board the U. S. S. *New York*.

(2) November 30, myself and Lieut. Radford and 22 men were detached. Lieut. Radford and 12 men were sent to the marine barracks, navy-yard, New York, and I with 10 men to guard the Columbus relics, with the custody of which I was charged, proceeded to Washington.

(3) Lieut. Barnett with the few men remaining continued on duty in connection with the naval exhibit until December 18, 1893, when all were withdrawn.

The camp equipage in use by the detachment, except the bedding and four tents, had been purchased out of the funds assigned to the naval exhibit, and when the men were finally withdrawn this property was turned over by your authority to the quartermaster of the Marine Corps.

The good behavior and soldierly bearing of the men were the subject of frequent and favorable comment, some of which expressed in official letters I have the honor to lay before you. These letters are the following:

WORLD'S COLUMBIAN COMMISSION,
OFFICE OF THE DIRECTOR-GENERAL OF THE EXPOSITION,
ADMINISTRATION BUILDING, JACKSON PARK,
Chicago, Ill., July 12, 1893.

DEAR SIR: You will permit me to express my profound gratitude for the prompt and heroic service which the marines under your command rendered during the awful catastrophe which visited these grounds on Monday, and I would be greatly obliged if you would have this letter read in the hearing of your men.

I have the honor to be, sir, your obedient servant,

GEORGE R. DAVIS,
Director-General.

Capt. B. R. RUSSELL, U. S. MARINE CORPS,
Camp Herbert, Jackson Park, Chicago, Ill.

DEPARTMENT OF STATE,
Washington, October 23, 1893.

SIR: The representatives of this Department on the Government board of managers, World's Columbian Exposition, having called my attention to the behavior of the marines under the command of Capt. Paul St. C. Murphy, U. S. Marine Corps, detailed to guard the Department of State exhibit, I desire to express my appreciation to you, and through your Department to thank the men, whose names are Privates Patrick Kane, Allen J. McDonald, Egbert W. Thomas, John MacDonald, Charles Masche, and John A. Dixon, for their exemplary conduct. They have been faithful, discreet, and courteous, and their fine personal appearance has gratified all visitors to the Department's section.

I have the honor to be, sir, your obedient servant,

W. Q. GRESHAM.

The SECRETARY OF THE NAVY.

DEPARTMENT OF STATE,
Washington, December 8, 1893.

SIR: I have the pleasure in informing you that the U. S. marines, under the command of Capt. Paul St. C. Murphy, which you kindly put at the disposal of this Department to guard and bring to Washington certain valuable documents lent by foreign governments to the United States to be exhibited at the World's Columbian Exposition, have performed the duty assigned them to the complete satisfaction of this Department, and that the objects under their care have been safely delivered here.

I desire to express to you my high appreciation of the service which you have hereby rendered this Department, and request that you will convey to Capt. Murphy my thanks for the efficient way in which he performed this duty.

I have the honor to be, sir, your obedient servant,

EDWIN F. UHL,
Acting Secretary.

The SECRETARY OF THE NAVY.

WORLD'S COLUMBIAN EXPOSITION,
OFFICE OF THE DIRECTOR-GENERAL OF THE EXPOSITION,
Chicago, Ill., December 15, 1893.

SIR: Shortly after the cold-storage fire I took occasion to thank the U. S. marines for their praiseworthy conduct at that unfortunate catastrophe, and I now desire to attest high appreciation of their general service during the Exposition. The detachment, numbering, as I understand, 3 commissioned officers and 60 men of the U. S. Marine Corps, was here during the entire period of the Exposition, and not only most efficaciously discharged its duty of guarding the Navy and State Department exhibits, but was of material assistance on many occasions of ceremony, acting as escort, and taking a prominent part in the marine functions which were given from time to time. The behavior of the marines throughout was excellent, and their officers zealous in furthering the common interests of the Government and the Exposition, as well as ever ready to extend proper courtesies. I have the honor to request that you convey the thanks of the Exposition to the members of the detachment.

Yours very truly,

GEO. R. DAVIS,
Director-General.

Capt. PAUL ST. C. MURPHY,
Commanding U. S. Marines, Jackson Park.

I would add that the zeal and ability shown by Lieuts. Barnett and Radford in connection with their duties contributed in no small degree to the efficiency of the detachment.

In closing this report I would take the opportunity to express my appreciation of the kind interest shown by you in all matters relating to the officers and men of the detachment, and in their name and my own to thank you.

I have the honor to be, sir, very respectfully,

PAUL ST. C. MURPHY,
Captain, U. S. Marine Corps, late Commanding Detachment,
U. S. Marines, Camp Herbert, Naval Exhibit.

Lieut. Commander E. D. TAUSSIG, U. S. NAVY,
Representative of the Navy Department, World's Columbian Exposition.

HEADQUARTERS U. S. MARINE CORPS,
QUARTERMASTER'S OFFICE,
Washington, D. C., August 17, 1894.

SIR: I respectfully submit the annual estimate for the support of the quartermaster's department, U. S. Marine Corps, for the fiscal year ending June 30, 1896, calling your attention to the fact that the amount asked for in this estimate is $26,570.40 more than the amount appropriated for the present fiscal year.

Increases under some heads are made as follows: Provisions, increased $16,570.40; clothing, same; fuel, same; military stores, same; transportation and recruiting, same; repair of barracks, increased $5,000; forage, same; hire of quarters, same; contingent, increased $5,000.

Total amount appropriated under the act of Congress approved July 26, 1894, for

the above items, fiscal year 1894–'95, was $267,210.50; amount asked for in present estimate for same objects, fiscal year 1895–'96, $293,780.90. Increase, fiscal year 1895–'96, as compared to fiscal year 1894–'95, $26,570.40.

Very respectfully,

H. B. LOWRY,
Major and Quartermaster.

The COLONEL COMMANDANT, U. S. MARINE CORPS,
Headquarters.

HEADQUARTERS U. S. MARINE CORPS,
PAYMASTER'S OFFICE,
Washington, D. C., July 25, 1894.

SIR: I respectfully submit herewith estimates for pay of officers, noncommissioned officers, musicians, and privates, and of civil force of the U. S. Marine Corps for the fiscal year ending June 30, 1896.

These estimates show an increase of $2,947.12 over amount appropriated for current fiscal year, viz:

Pay of retired officers, increase	$600.00
Pay of retired enlisted men, increase	2,345.37
Pay of civil force, increase	1.75
Total increase	2,947.12

Very respectfully,

GREEN CLAY GOODLOE,
Major and Paymaster, U. S. Marine Corps.

The COLONEL COMMANDANT, U. S. MARINE CORPS,
Headquarters, District of Columbia.

HEADQUARTERS U. S. MARINE CORPS,
Washington, D. C., September 1, 1894.

SIR: In accordance with the Department's instructions of July 2 last, I have the honor to inclose herewith, for your approval, the annual estimates for the support of the U. S. Marine Corps for the fiscal year ending June 30, 1896.

I have had included in those of the quartermaster the sum of $2,500 for the erection of suitable officers' quarters at the marine barracks, Sitka, Alaska. As stated last year, this is made necessary in order that that part of the enlisted men's quarters now occupied by the officer in command there may be restored to its legitimate use, and to provide for the accommodation of another officer whom it is my desire to order to that station, as two officers should be there for the better performance of duty.

Under the same head the sum of $6,000 is included for necessary repairs which should be made at the marine barracks, navy-yard, Mare Island, Cal., as recommended by boards of survey on file in the office of the quartermaster U. S. Marine Corps.

In accordance with the Department's directions of May 26, 1894, as contained in its fifth indorsement, No. 3044, I have included the sum of $4,500 for necessary alterations to be made at the marine barracks, League Island, Pa., recommended by a board of survey, the report of which is on file in the quartermaster's office. These specific sums are asked for, as the general estimate under this head will not admit of performing the required work.

The estimate for provisions is increased, as it has been found by experience that the sum appropriated in past years has been insufficient, and deficiencies varying from $10,000 to $15,000 have been necessary each year for several years past under this head. The amount estimated this year is based on the contract price of rations and the number of men on shore.

If the item providing for the transfer of balances between the quartermaster U. S. Marine Corps, and the Paymaster-General U. S. Navy, had been allowed to stand in this year's appropriation act, this increase would not be necessary.

There are 2,100 men in the Marine Corps, to subsist whom provision is made by appropriating for 1,100 on shore and 1,000 afloat, the Navy receiving the appropriation for the latter number and the quartermaster Marine Corps providing for the former. It has rarely happened that as many as 1,000 men have been afloat, and the Navy, in consequence, does not expend the total amount of money allowed, while on the other hand there are often more than 1,100 men on shore, and there is consequently not enough money to pay for their subsistence, and a deficiency has been of almost yearly occurrence for years past, under the head of provisions.

If the Paymaster-General U. S. Navy was authorized to transfer the unexpended balance of the appropriation allowed him for the subsistence of marines afloat, to the quartermaster U. S. Marine Corps, this state of affairs would be avoided and no deficiency would be created, but unless it is done the additional amount estimated for should be allowed, as it is imperatively needed.

The estimate for "contingent" is increased $5,000, as with the addition of three new posts, viz, Sitka, Alaska; Newport, R. I., and Port Royal, S. C., it is found that the sum appropriated in past years for the smaller number of posts is insufficient.

The paymaster's and quartermaster's letters explaining their estimates are inclosed herewith.

Very respectfully, your obedient servant,

CHARLES HEYWOOD,
Colonel, Commandant.

The SECRETARY OF THE NAVY,
Washington, D. C.

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the paymaster of the U. S. Marine Corps.

Detailed objects of expenditure, and explanations.		Estimated amount which will be required for each detailed object of expenditure.
PAY OF MARINE CORPS.	(R. S., p. 272, secs. 1506, 1623; acts June 30, 1834, vol. 4, secs. 4, 5; Mar. 2, 1847, vol. 9, sec. 3; Aug. 5, 1854, vol. 10, sec. 1; Feb. 21, 1857, vol. 11, sec. 1; July 17, 1862, vol. 12, sec. 2; June 30, 164, vol. 13, sec. 1; Mar. 3, 1865, vol. 13, sec. 1; July 28, 1866, vol. 14, sec. 13; Mar. 2, 1867, vol. 14, secs. 1, 7; July 15, 1870, vol. 16, sec. 3; Jan. 30, 1885, vol. 23, sec. 1; Navy Regulations, July 18, 1816; Feb. 27, 1893, vol. 27, sec. 1; Mar. 3, 1893, vol. 27, sec. 1.)	
Pay of officers on the active list:		
1 colonel commandant, 1 colonel, 2 lieutenant-colonels, 1 paymaster, 1 quartermaster, 1 adjutant and inspector, 4 majors, 2 assistant quartermasters, 20 captains, 30 first lieutenants, and 12 second lieutenants		$179,320.00
Pay of officers on the retired list:		
3 colonels, 2 lieutenant-colonels, 1 major, 1 quartermaster, 1 adjutant and inspector, 1 assistant quartermaster, 12 captains, 3 first lieutenants, and 3 second lieutenants		57,465.00
Pay of noncommissioned officers, musicians, and privates:		
1 sergeant-major, 1 quartermaster-sergeant, 1 leader of the band, 1 drum-major, 50 first sergeants, 140 sergeants, 180 corporals, 30 musicians, 96 drummers and fifers, and 1,600 privates, and for the expenses of clerks of the U. S. Marine Corps traveling under orders		381,847.67
Pay of retired enlisted men:		
1 sergeant-major, 1 drum-major, 3 first-class musicians, 9 first sergeants, 17 sergeants, 3 corporals, 2 drummers, 2 fifers, and 42 privates, and for those who may be retired during the year		27,000.00
Undrawn clothing:		
Payment of discharged soldiers for clothing undrawn		24,000.00
Mileage:		
Mileage to officers traveling under orders without troops		9,000.00
Commutation of quarters to officers on duty without troops where there are no public quarters		4,550.00
PAY OF CIVIL FORCE.		
In the office of the colonel commandant:		
1 chief clerk		1,540.80
1 messenger, at $80.94 per month		971.28
In the office of the adjutant and inspector:		
1 chief clerk		1,540.80
1 clerk		1,496.52
In the office of the paymaster:		
1 chief clerk		1,600.00
1 clerk		1,496.52
1 clerk		1,257.12
In the office of the quartermaster:		
1 chief clerk		1,540.80
1 clerk		1,496.52
1 clerk		1,257.12
In the office of the assistant quartermaster, Washington, D. C.:		
1 clerk		1,400.00
In the office of the assistant quartermaster, Philadelphia, Pa.:		
1 clerk		1,400.00
1 messenger, at $1.75 per diem		640.50
Total pay of civil force		17,637.98
Total amount to be appropriated under each head of appropriation		700,820.65
Amount appropriated for the current fiscal year ending June 30, 1895		700,820.65

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the quartermaster's department, U. S. Marine Corps.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
Provisions:			
For 1,100 noncommissioned officers, musicians and privates, and for commutation of rations to 11 enlisted men detailed as clerks and messengers, also for payment of board and lodging of recruiting parties, said payment for board not to exceed $2,500	$90,000.00		
The amount required to be transferred to appropriation pay Marine Corps on account of retired men and those that may be retired	6,570.40	$96,570.40	$80,000.00
NOTE No. 1.—The commutation in lieu of rations in kind at $1.75 to these enlisted men, also commutation of quarters at $21 and $10 per month, authorized by order of the Navy Department, dated June 20, 1880, and July 30, 1885.			
NOTE No. 2.—There are 80 retired enlisted men at this date.			
Clothing:			
For 2,100 noncommissioned officers, musicians, and privates	.....	80,000.00	80,000.00
Fuel:			
For heating offices, barracks and quarters, ranges and stoves for cooking, fuel for enlisted men, for sales to officers, maintaining electric lights, and for hot-air closets, and for per diem of enlisted men employed in connection with electric light and heating apparatus	.....	19,500.00	19,500.00
Military stores:			
For pay to chief armorer at $3 per day and 3 mechanics at $2.50 each per day, in all	3,286.50		
For purchase of military equipment, such as cartridge boxes, bayonet scabbards, haversacks, blanket bags, knapsacks, canteens, musket slings, swords, drums, trumpets, flags, waist belts, waist plates, cartridge belts, sashes for officer of the day, spare parts for repairing muskets, purchase of ammunition, purchase and repair of instruments for the band, purchase of music and musical accessories, medals for excellence in gunnery and rifle practice, good-conduct badges, incidental expenses in connection with the school of application, signal equipment and stores, binocular glasses, for the establishment and maintenance of targets and ranges, for hiring established ranges, for procuring and handling ammunition, etc	10,000.00	13,286.50	13,286.50
Transportation and recruiting:			
For transportation of troops and the expenses of the recruiting service	.....	15,000.00	15,000.00
Repair of barracks:			
At Portsmouth, N. H.; Boston, Mass.; Newport, R. I.; Brooklyn, N. Y.; League Island, Pa.; Annapolis, Md.; headquarters and navy-yard, Washington, D. C.; Norfolk, Va.; Pensacola, Fla.; Mare Island, Cal.; Port Royal, S. C., and Sitka, Alaska; and per diem for enlisted men employed under the direction of the Quartermaster's Department on the repair of barracks and other public buildings	10,000.00		
For alteration and repair of marine barracks and other public buildings, repair of parade ground, relaying walks and gas and water pipes at navy-yard, Mare Island, Cal	6,000.00		
For erection of officers' quarters at Sitka, Alaska	2,500.00		
For rent of building used for manufacture of clothing, storing supplies, and office of assistant quartermaster, Philadelphia, Pa	2,000.00		
For filling in barracks inclosures, building wall north side of barracks, raising dike, and raising and putting underpinning, coal house and men's water-closet, navy-yard, League Island, Philadelphia, Pa	4,500.00	25,000.00	20,000.00
Forage:			
For forage in kind for 5 horses of the Quartermaster's Department and the authorized number of officers' horses	.....	2,800.00	2,800.00

Estimates of appropriations required for the service of the fiscal year ending June 30, 1896, by the quartermaster's department, U. S. Marine Corps—Continued.

Detailed objects of expenditure and explanations.	Estimated amount which will be required for each detailed object of expenditure.	Total amount to be appropriated under each head of appropriation.	Amount appropriated for the current fiscal year ending June 30, 1895.
Hire of quarters:			
For hire of quarters for officers serving with troops where there are no public quarters belonging to the Government and where there are not sufficient quarters possessed by the United States to accommodate them	$4,500.00		
For hire of quarters for 7 enlisted men employed as clerks and messenger in commandant's, adjutant and inspector's paymasters, and quartermaster's offices, Washington, D. C., and assistant quartermaster's office, Philadelphia, Pa., at $21 each per month	1,764.00		
Hire of quarters for 3 enlisted men employed as above, at $10 each per month	360.00	$6,624.00	$6,624.00
Contingent:			
For freight, ferriage, tolls, cartage, washing of bedsacks, mattress covers, pillowcases, towels and sheets, funeral expenses of marines, stationery, toilet paper, telegraphing, rent of telephones, purchase and repair of typewriters, apprehension of stragglers and deserters, per diem of enlisted men employed on constant labor for a period of not less than ten days, repair of gas and water fixtures, office and barrack furniture, mess utensils for enlisted men, such as bowls, plates, spoons, knives and forks, packing boxes, wrapping paper, oilcloth, crash, rope, twine, camphor, carbolized paper, carpenter's tools, tools for police purposes, iron safes, purchase and repair of public wagons, purchase and repair of public harness, purchase of public horses, services of veterinary surgeons and medicines for public horses, purchase and repair of hose and fire extinguishers, purchase and repair of lawn mowers, purchase of fire hand grenades, purchase and repair of carts and wheelbarrows, purchase and repair of cooking stoves, ranges, stoves and furnaces where there are no grates, purchase of ice, towels, and soap for offices, postage stamps for foreign postage, purchase of books, newspapers, and periodicals, improving parade grounds, repairs of pumps and wharves, laying drain, water and gas pipes, water, introducing gas and for gas and gas oil, introduction and maintenance of electric lights, straw for bedding, mattresses, mattress covers, pillows, wire bunk bottoms for enlisted men at the various posts, furniture for Government houses and repairs of same, and for all emergencies and extraordinary expenses arising at home and abroad, but impossible to anticipate or classify: in all	.....	30,000.00	30,000.00
Total	.....	288,780.90	267,210.50

Schedule of proposals for supplies for the Marine Corps under advertisement inviting proposals dated March 12, 1894.

Name.	Class.	Amount.
Charles W. Hayes	1, 3	*$3,010.40
H. T. Kent	1	*24,229.00
Wendell, Troy & Co.	1	28,814.50
T. C. Gill & Co.	4	73.50
Manhattan Supply Company	1, 3, 4	*18,625.40
Hanlan & Goodman	4	184.32
W. H. Wiley & Son	1	*165.00
J. H. Tissot, jr.	1, 3, 4	*6,177.40
R. Levick's Son & Co.	1	1,945.50
J. W. Pepper	2	*762.14
W. E. Goodman	2, 3	*1,809.10
Shoemaker & Burch	4	*663.21
H. H. Owens	1, 3	654.00
P. J. Hallahan	1	7,580.00
J. Loeb	1, 2, 3	*992.12
B. Y. Pippey & Co.	1	*31,679.33
N. Thomas & Co.	1, 2, 3, 4	*5,558.05
J. P. Newrath	2, 3, 4	*1,955.00
F. H. Smith	1	20,227.50
Hartford Wire Mattress Company	1	285.00
M. M. Michael	1, 2, 3	*8,437.35
B. Rich & Son	1	3,975.50
T. G. Hood	1, 2, 3	*19,835.60
W. H. Horstmann Company	1, 2, 3, 4	*15,405.54
Cavanagh & Thompson	1, 4	*10,881.48
E. D. Holmes	1	*1,036.50
M. M. Sargent's Sons	4	93.00
Paul J. Field	4	*830.08
Buena Vista Mills	1	*22,874.50
W. F. Bernstein	1	*782.00
S. M. Evans	1	2,634.25
Lyons Bros	1	475.00
J. A. Joel	1	*2,829.50
J. Galbraith	4	*457.50
R. Wurlitzer	2	588.25
Watsontown Boot and Shoe Company	1	*7,120.00
Conshohocken Woolen Company	1	9,240.00
F. H. Allison	4	*514.50
Liberty Woolen Mills	1	9,205.00

* Accepted for part of class.

Schedule of proposals received for supply of rations for the Marine Corps for the year 1895, under advertisement from the quartermaster's office dated March 12, 1894.

Names of contractors.	Portsmouth, N. H.	Charlestown, Mass.	Brooklyn, N. Y.	Philadelphia, Pa.	Washington, D. C.	Gosport, Va.	Annapolis, Md.	Newport, R. I.	Mare Island, Cal.	Sitka, Alaska.
W. H. Belford	$22.00	$19.00	$16.41					*$33.00		
F. Hume				$27.50	$18.23		*$18.43		$24.73	
J. C. Ergood & Co.	21.74	21.96	23.75	*24.73	18.97	$21.76	18.96			
D. C. Norton & Co.	21.85								19.40	
J. Brownlie										
J. T. Parker & Bro						*17.95				
Public Market Co.		*13.25								
C. A. Simonds	19.90	14.35	18.90							
S. J. Cronin	22.00	14.59								
C. S. Hewlett					*18.00					
C. E. Ahern			*14.85							
A. Koch			16.45							
D. V. Miller							20.00			
H. R. Paul	*18.17									
M. L. Kelly									17.99	
J. Megarny									*17.19	
W. J. Jachs										*$42.00
E. DeGroff										44.00

* Awarded.

Schedule of proposals received for supply of wood and coal to the Marine Corps, under advertisement of the quartermaster's office dated March 12, 1894.

Name of bidders.	Wood (per cord).			Coal (per ton).						
	Oak, in stick.	Pine, in stick.	Pine (kindling), sawed and split.	Red ash (egg).	Red ash (stove).	White ash (egg).	White ash (stove).	White ash (furnace).	White ash (nut).	Wellington.
Marine barracks, Portsmouth, N. H.:										
A. Stevenson	*$6.70									
W. H. Sise						$5.91		$5.91		
C. E. Waller & Co	6.75					*5.25		*5.25		
E. C. Spinney	6.75									
S. G. French	6.74					5.98		5.98		
Marine barracks, Charlestown, Mass.:										
G. W. Winslow & Co	9.00	*$7.00	*$9.00			*5.25	*$5.55	*5.25	*$5.55	
J. E. Lewis & Co	*8.50	7.00	9.75			5.88	5.88	5.88	5.88	
J. J. Convery	15.00	15.00	16.00			7.50	7.50	7.50	7.50	
Marine barracks, Brooklyn, N. Y.:										
D. F. Wells						4.12			*4.64	
Moquin & Offerman						4.75			4.65	
M. Morganstein	11.75	11.75	12.75							
S. G. French	*8.74	*8.74	*8.74			*3.98			*4.74	
J. J. Convery						5.65			5.99	
Marine barracks, League Island, Pa.:										
S. G. French						5.08	5.18		5.18	
J. J. Convery	*16.00	*16.00				5.13	*5.13		*5.13	
T. McConnell						5.39	5.39		5.39	
Offices and officers' quarters, Philadelphia, Pa.:										
J. J. Convery	15.00	16.00			*$5.00	*4.90				
T. McConnell	*13.25		*13.25		5.39	5.39				
Marine barracks, Annapolis, Md.:										
J. S. M. Basil	*4.24	*3.24	*4.24		*5.99	*4.99	*5.24			
Offices and officers' quarters in Washington and Georgetown, D. C., and within 1 mile of limits of said cities:										
J. Miller & Co	6.00	5.00	7.00	$6.50	6.50	5.75	5.75	5.00	5.25	
J. Williams	*4.90	*4.40	*5.50	*5.75	*6.00	*5.10	*5.30	*4.95	*5.25	
Marine barracks, navy-yard, Washington, D. C.:										
J. Miller & Co	5.50	4.50				5.20	5.45	5.20	5.40	
J. Williams	*4.80	*4.40				4.90	*5.05	*4.80	*4.90	
Jones & Sheriff						*4.83	5.29	4.99	5.14	
F. A. Kennedy	5.50	5.00				5.10	5.75	5.00	5.50	
Marine barracks, Norfolk, Va.:										
W. & J. Parker	*6.00	*5.50					6.50	6.25		
S. G. French							*5.98			
J. Miller & Co	6.50	6.00					6.45			
S. Neimeyer	6.00	6.00	8.00		7.90	*6.40	6.40	6.40		
Officers' quarters, Norfolk, Va.:										
W. & J. Parker	*6.00	*5.50	*6.50		7.50			7.00		
S. G. French					*6.74	6.44		*6.24		
J. Miller & Co	6.50						6.45			
S. Neimeyer	6.00	6.00	8.00		7.90	*6.40	6.40	6.40		
Marine barracks, Mare Island, Cal.:										
S. G. French						*12.24				
R. J. Aden	*10.40					15.60				$12.90
Marine barracks, Newport, R. I.:										
S. G. French	*9.94	*9.94				*7.14	*7.14			

* Awarded.

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